English



Instructions for Use

IntelliSpace PACS Enterprise with iSyntax User Guide

R4.4

PHILIPS

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1 Introduction

CAUTION ***In the United States, Federal law restricts this device to sale, distribution, and use by or on the order of a physician.***



WARNING ***Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.***

1.1 About IntelliSpace PACS Enterprise



WARNING ***Do not use portable devices such as smart phones or iPads (tablet PCs) for diagnostic purposes.***

IntelliSpace PACS Enterprise is an enterprise-wide, Web-based image distribution solution that delivers the power of radiology to the point of patient care. IntelliSpace PACS Enterprise is based on iSyntax technology which provides clinicians access to diagnostic-quality images anytime, anyplace, throughout the healthcare environment. Physicians can access all images, including radiology, cardiology, dermatology, mammography, and pathology.

Clinicians can access a patient history timeline to view a patient's entire clinical history. Additional features include Presentation States, scout tools for advanced navigation and interrogation, cross-modality linking, and color support for all modalities. These advanced clinical tools enable clinicians to provide faster and more accurate care to their patients.

IntelliSpace PACS Enterprise runs on standard PCs and networks, and does not require expensive, dedicated workstations and networks.

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1.2 Intended Use

IntelliSpace PACS 4.4 is an image management system intended to be used by trained professionals, including but not limited to physicians, nurses and medical technicians.

The system is a software package used with general purpose computing hardware to acquire, store, distribute, process and display images and associated data throughout a clinical environment. The software performs digital image processing, measurement, communication and storage.

IntelliSpace PACS 4.4 supports receiving, sending, printing, storing and displaying studies received from the following modality types via DICOM: CT, MR, NM, US, XA, PET, DX, DR, RF, RT, MG, SC, VL, as well as hospital/radiology information systems.

1.3 Indications for Use

IntelliSpace PACS 4.4 is an image management system intended to be used by trained professionals, including but not limited to physicians, nurses and medical technicians.

The system is a software package used with general purpose computing hardware to acquire, store, distribute, process and display images and associated data throughout a clinical environment. The software performs digital image processing, measurement, communication and storage.

Lossy compressed mammographic images and digitized screen images must not be reviewed for primary image interpretations.

Mammographic images may only be interpreted using an FDA approved monitor that offers at least 5 Mpixel resolution and meets other technical specifications reviewed and accepted by FDA.

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1.4 When to Use IntelliSpace PACS Enterprise

IntelliSpace PACS Enterprise is designed to assist you in conjunction with primary diagnostics already provided by a certified Radiologist, or while in direct/live consultation with a Radiologist.

1.5 Training

Users of this software must have received adequate training on its safe and effective use before attempting to operate the product described in this Instructions for Use. Training requirements for this type of software will vary from country to country. Users must make sure they receive adequate training in accordance with local laws or regulations.

1.6 Safe Usage Environment for IntelliSpace PACS Enterprise

WARNING

- ***Make sure that you have a local printer available in order to print directly from the modality, should the system become unavailable.***
- ***Make sure that you are using appropriate monitors, and that they are properly configured and calibrated prior to using IntelliSpace PACS Enterprise.***

Before using this product, your computer system must be set up in the proper environment for viewing images.

- Make sure that you are using appropriate monitors, and that they are properly configured and calibrated prior to using IntelliSpace PACS Enterprise.
- Your computer monitor should be placed in a location where there is no direct sun or illumination shining on the monitor.
- Your computer monitor and chair should be adjusted for a proper viewing height.
- Your computer system and monitor should get inspected monthly by your System Administrator for proper operation.

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- You should be able to operate the mouse on a smooth surface without any obstructions.

1.7 Contraindications

None known.

1.7.1 When Not to Use IntelliSpace PACS Enterprise

WARNING ***IntelliSpace PACS Enterprise should not be used to render a primary diagnosis.***

Do not use this product if:

- You know that the computer system you are using is clearly malfunctioning.
- Your System Administrator tells you not to.
- An error or warning message displays on the computer system.
- You are aware of any system problems or malfunctions. Always notify your System Administrator of any potential system problems or availability issues as soon as possible.

1.8 About This Publication

This publication is part of the IntelliSpace PACS Instructions for Use, which also includes the following other publications:

- IntelliSpace PACS Radiology User Guide
- IntelliSpace PACS AdminTool User Guide

This Instructions for Use is intended for clinical and administrative users of IntelliSpace PACS. Anybody in a health care organization who intends to use this product should read this manual carefully. We also recommend that you receive basic product-use training from your System Administrator or from a Philips IntelliSpace PACS applications specialist.

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Before attempting to use this software, you must read this Instructions for Use thoroughly, paying particular attention to all Warnings, Cautions, and Notes it contains. You must pay special attention to all the information given, and procedures described, in the Safety section. In addition you must pay special attention to on-screen messages that may relate to the function being executed.

Warnings are directives which if not followed could cause fatal or serious injury to a user, patient, or other person, or could lead to clinical misdiagnosis, and/or loss/damage of patient-related data.

Cautions are directions which, if not followed could cause damage to equipment on which the software is installed.

Notes are intended to highlight points of attention as an aid to users.

This Instructions for Use describes the most extensive configuration of the software, with the maximum number of options. Not every function described may be available.

WARNING ***The "Safety" chapter describes safety aspects and should be read first, before using this software.***

IMPORTANT ***The screen captures in the Instructions for Use show the user interface in English and have been included as samples of the user interface. Callouts or red circles on screen captures identify the part of the user interface that is described in the text.***

1.9 Contact and Trademark Information

1.9.1 Company Contact

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Foster City, CA 94404
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1.9.2 Trademarks and Copyrights

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2 Safety

2.1 Safety Messages



WARNING *Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*



WARNING *Do not use portable devices such as smart phones or iPads (tablet PCs) for diagnostic purposes.*



WARNING

- *Make sure that you have a local printer available in order to print directly from the modality, should the system become unavailable.*
- *Make sure that you are using appropriate monitors, and that they are properly configured and calibrated prior to using IntelliSpace PACS Enterprise/Radiology.*



WARNING *IntelliSpace PACS Enterprise should not be used to render a primary diagnosis.*

- *Please adhere to your site security policy to establish strong passwords and take appropriate measures to secure the network environment to prevent access by unauthorized users and possible modification to patient data.*
- *Each user is assigned a unique User ID and password. This prevents users from sharing the same personal folders, user preferences, and shortcuts and prevents one user from deleting or changing the user preferences and personal folders of other users. You should never share your User ID and password.*



WARNING

- *True Size should not be used as a measurement tool, since pixel pitch is often misleading on certain monitors.*
- *Before making clinical decisions, you must ensure that the proportions of the image are close to real size proportions. Also, you should use the measurement, annotation, and image scale tools available in IntelliSpace PACS, rather than using physical rulers or other tools.*



WARNING *Incorrect Pixel Spacing and Pixel Pitch values affect the accuracy of the True Size feature. Therefore, you should always make sure that the size of the image is as expected when reviewing a True Size zoomed image.*

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- *Issues including delays with image retrieval, delays in Study migration between servers/locations, and application responsiveness issues (pauses, halting) may be experienced when the PACS Service is used on a network that does not meet the Minimum Network Requirements.*
- *Be aware that remote sites that do not connect directly to the main site and/or that connect with a sub-optimal bandwidth, can cause incomplete transfer of or unavailability of critical data at the time of diagnosis.*



Because of the pervasive use of lossy compression and other image processing methods in the medical industry (such as edge detection), it is at the discretion of the diagnostic viewer to treat these images as diagnostic.



It is the customer's responsibility to make sure patients have unique patient identifiers (MRNs) within a federation.



After you edit patient-related demographics, the updates are not immediately propagated to other parts of IntelliSpace PACS.



The Merge option has been identified as a hazard area in IntelliSpace PACS that could result in an incorrect or delayed diagnosis or delayed treatment. Philips strongly recommends that you visually verify the patient records you want to merge before merging.



There is no undo function for the patient merge.



The Delete Patient option has been identified as a hazard area in IntelliSpace PACS that could result in no diagnosis or a delayed diagnosis. If done incorrectly, this procedure may affect patient diagnosis and patient care. Therefore, only qualified and thoroughly trained professionals should be given access to this feature. These professionals should be completely aware of the ramifications of deleting a patient record before undertaking this operation. Philips strongly recommends that you back up data if possible and visually verify the patient record before deleting.



The Restore Color Image feature is configured using DICOM Sources to specify the source and modality type of the study. Please exercise caution when using this feature with scanned-in images.

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WARNING ***Enabling any non-zero deviation can cause alteration of true colors. You should exercise caution when using the Restore Color Image feature and verify the accuracy or display with a phantom. You should also exercise caution with using this feature with scanned-in images.***

WARNING ***Review the configuration before linking or merging patients to make sure the correct patients are linked or merged.***

WARNING ***An incomplete merge may result in insufficient data or images that can result in delayed patient treatment or misdiagnosis. A warning message at the time of a patient merge error will display, indicating that the merge is incomplete and giving the demographics of the two patients being merged. The user is given the option to perform the merge again. The unsuccessful merge will be indicated as "Incomplete" in the audit trail.***

WARNING ***The incorrect use of the Delete Exam feature poses serious threats to patient diagnosis and patient care. Therefore, only qualified and thoroughly trained professionals should be given access to this feature. You should take the following precautions when deleting patient exams:***

- ***Regularly backup your system—only data that has been saved to a backup medium can be restored to your database; if you need to restore a patient record that was deleted in error, you will need a backup medium from which to retrieve the erroneously deleted record.***
- ***Visually verify the patient exam before deleting.***

WARNING ***You cannot link exam notes to linked exams. For example, if you link CHESTABDOMEN- PELVIS exams and an exam note is attached to the CHEST exam, this exam note will not be displayed in the worklist and Canvas Page associated with the ABDOMEN and PELVIS exams. Also, the exam note might contain information on the linked exams that will not be visible to the reading physician or clinician.***

WARNING ***Locks are granted on a per-user basis. This means that if multiple users log into IntelliSpace PACS using the same user ID, these users will be able to unlock and mark read exams that are locked by each other. To prevent this from occurring, make sure you confirm the patient identity and demographic information before beginning an exam.***

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WARNING

- ***Make sure that patient demographics are properly completed, so that all patient data is available for the Radiologist and Referring Physician, and diagnosis is not delayed.***
- ***Avoid editing patient data at the modality without starting a new exam. This could potentially mix patient studies and therefore cause a Duplicate UID.***

WARNING

Exam Notes and Diagnostic Reports are not the same entity. Medical treatment plans should never be based on Exam Notes alone, as Exam Notes often have preliminary information. Diagnostic Reports can be used to help physicians design a medical treatment plan.

WARNING

If immediate medical treatment is needed, or if you disagree with a prior exam note, contact the treating physician immediately. You should not rely on creating a critical exam note in these situations.

WARNING

IntelliSpace PACS stores all timestamp information in GMT. Microsoft Windows then localizes this information so that all timestamps are presented in local time (as configured on the workstation). Because Microsoft may make changes in its operating systems to account for Daylight Savings Time in various time zones around the world, please ensure that user machines have the most current Microsoft updates installed so that correct times are displayed in IntelliSpace PACS reports.

WARNING

When running a worklist query using a patient's MRN, it is possible that the non-numeric characters may be stripped from the MRN, possibly causing a mismatch of patient data between two or more patients. Make sure you validate the MRN against the patient name to ensure the returned patient data matches the patient you are looking for.

WARNING

You need to know the following information to use the Exceptions Handler safely in a live clinical environment. If you do not understand any of these warnings or how they affect you, contact your IntelliSpace PACS System Administrator or Philips Customer Care.

- ***To avoid unauthorized access to imaging exceptions, do not leave a computer unattended while the Exceptions Handler is running. As a user of the Exceptions Handler, you assume responsibility for unauthorized access as long as you are logged in to the program. Before leaving a workstation, you should close the Exceptions Handler and log out of IntelliSpace PACS.***

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- *When an exception is resolved, IntelliSpace PACS discards the original scanner information and replaces it with information from the HIS/RIS, resulting in a complete loss of scanner information. If an exception was resolved in error and the exception is later unresolved by unlinking the exam from the image (resulting in a user-created or manual exception), the window now displays the HIS/RIS information that replaced the scanner information when the exception was originally resolved. This makes resolving the exception difficult because the HIS/RIS information is no longer accurate for this exception. IntelliSpace PACS retains the HIS/RIS data because the original scanner information was discarded upon the initial resolution of the exception and there is no other data in the database to associate with the exception. Therefore, we strongly recommend that care be taken when resolving exceptions to avoid the loss of original image header information captured at the scanner.*
- *Please take care when resolving exceptions to exams that have already been dictated or marked read. Philips encourages customers to notify the responsible reading Radiologist of the exception images being added to the exam, because these images may not have been viewed at the time of dictation.*

WARNING *Make sure you associate the exception study with the correct patient or exam.*

WARNING

- *Deleting an exception study is a potentially hazardous operation, and cannot be undone and images cannot be recovered. You should review the Warnings in this chapter to ensure that you understand the possible ramifications of deleting an exception study.*
- *Make sure that you understand that when you detach DICOM studies from an exam and delete the subsequent exception, you are, in fact, permanently deleting those studies. Deleted studies may contain data that would render a different diagnosis.*

WARNING

- *Make sure you label the left and right sides of an image correctly to prevent incorrect patient orientation and the possibility of misdiagnosis.*
- *Make sure you follow industry best practices for correct patient orientation.*
- *Make sure the images were acquired correctly at the modality before using them for diagnosis.*
- *Make sure you validate third party software to ensure that it is using the correct information from the outside source. In addition, proper validation of third party software must be done to ensure that it is using standard DICOM tags. Images that*

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are submitted with a different pixel spacing tag than what IntelliSpace PACS uses (0018,1164) to perform measurements on projection radiography images could lead to incorrect measurement readings, thus leading to misdiagnosis and treatment planning.



WARNING ***Use caution when saving an image to the clipboard and copying it to another application. The image may contain confidential patient information.***



WARNING

- ***GSPS may contain clinically relevant data (such as measurements), which may display incorrectly or not at all. This could cause a misdiagnosis or a delay in treatment.***
- ***If an error is discovered within the GSPS, a warning icon displays that indicates all GSPS content may not be displayed.***
- ***When multiple third-party GSPS are received, IntelliSpace PACS displays the most recent one first, because no priority information is available. This may mean that other Presentation States are not displayed by default, so the chronology may be affected, possibly leading to misdiagnosis.***



WARNING ***An image artifact may appear when a Modality LUT or a mask is applied to a sub-sampled image. The sub-sampled image means that the image data is not fully retrieved from the server and, therefore, not displaying at full resolution. Diagnosis should only occur on images that are displayed at full (100%) resolution. If images are displayed at full resolution, no artifact should appear.***



WARNING ***If immediate medical treatment is needed, or if you disagree with a prior exam note, contact the treating physician immediately. You should not rely on creating a critical exam note in these situations.***



WARNING ***Measurement values are modality dependent. The measurement values that IntelliSpace PACS displays are derived from information sent by the modality responsible for generating the image being measured. If this modality is incorrectly configured or defective, IntelliSpace PACS measurement values may be adversely affected and may be incorrect. Philips strongly recommends the use of an appropriately placed object of known size for determining what magnification factor has been applied to the image.***

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WARNING

Note the following:

- *When performing an ROI measurement on an image that is displayed with a resolution smaller than the actual image (for example, an image in the rack for CT), IntelliSpace PACS may calculate the ROI using a sub-sample of the original image data. The value in this case is an accurate representation of the average measured pixel values represented by the interpolated sub-sampled image. This is a close approximation to the original pixel values.*
- *When IntelliSpace PACS calculates a measurement using a sub-sample of an image, the measurement result is displayed with a "~" (meaning approximate value) in front of it.*
- *When opening and displaying an image in full resolution, the ROI measurement values are recalculated. The "~" sign is no longer displayed, and there might be a small update/change from the measurement values displayed initially.*

WARNING

- *Do not use CDs and DVDs as a permanent or fail-safe archive for patient data. When storing data on a CD or DVD, IntelliSpace PACS does not verify that the patient data is correctly stored and retrievable. In addition, CDs and DVDs may deteriorate over time. For long-term storage, all patient data should be stored in an archiving system (such as a PACS).*
- *Do not diagnose from media such as CDs or DVDs.*

WARNING

Images printed to paper from IntelliSpace PACS are not intended for diagnosis, and should be used only for communication purposes.

WARNING

- *Data that has been retrieved from a VNA archive may be changed in the VNA by a third party user while a copy of the data is stored in the IntelliSpace PACS Cache. To make sure that you have the latest patient and study information, delete the study in the Cache using the Server Utility Tool, and then use iQuery to search the VNA archive for the latest data. Note that when the Cache reaches capacity, studies are automatically deleted. Therefore, verify that the study is present in the Cache, because if the Cache is full, the study may be deleted automatically.*
- *During DICOM Query of a VNA from the Timeline, a message displays on the Canvas Page if retrieving data from a VNA archive takes too long or if the DICOM file is extremely large. The Canvas Page displays the images after they have been retrieved. The user can click Retry to load the images.*

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Linking Warnings

WARNING

General Warning Message

The current implementation of the Link tool allows you to synchronize other windows/series with the window/series you are currently browsing through. In other words, there is one master window/series (typically the one that you have selected with your mouse) and IntelliSpace PACS tries to line up the images of the other linked windows. Therefore, you should always review each and every series by paging through them individually, and never rely on linking as a way to review all images within a given exam. Browsing through a series that is part of a link may not display all the images that are available in the other linked series.

WARNING

When using the series linking feature, it is possible that images may be missing, which could cause misdiagnosis. Possible causes of missing images are:

- ***Linking multiple series with different slice thickness***
- ***Linking series that contain different body parts or cover a larger or smaller region***
- ***Linking Oblique series***

WARNING

Linking a Multi-Phase Series with Another Series

Multi-phase studies contain multiple images with the same location identifier. Paging through a multi-phase series that has not been split typically results in jumping back to the first slice location each time you reach the end of each phase within the series.

- ***If a multi-phase series is used as the master, the other linked series are synchronized on location and display the image with closest location to the one displayed in the master series.***
- ***If the non multi-phase series is used as the master, IntelliSpace PACS tries to find the image with the closest location in the multi-phase series, and because there are potentially multiple matches, IntelliSpace PACS displays the best match from the first phase. (In this example IntelliSpace PACS would never display image 7 through 12.)***

This means that it is not possible to review all images of a multi-phase series by paging through another series while using the Link tool.

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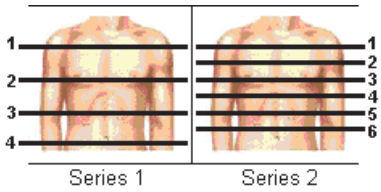


- ***If a multi-phase series is not split correctly, and a user links multiple series where one of the series contains multiple phases, the link function will not work correctly because not all images will be displayed while paging through the series. IntelliSpace PACS can be configured to automatically split all studies from a particular CT modality in multiple series based on DICOM tag (0021,0012). However, because not all modalities can be configured to provide a unique identifier that can be used for splitting, IntelliSpace PACS provides the ability to manually split studies. A technologist can perform this function and save it as a Presentation State, or a Radiologist can manually split a study after first opening the study.***

WARNING

Linking Multiple Series with Different Slice Thickness

An exam might contain multiple series acquired at different (or even variable) slice thickness. For example, one series might be acquired at 10mm slice thickness and one at 2mm. If you link these series and page through them using the very thick 10mm series as the master, many images from the 2mm series will be skipped. If you page through the images using the very thin 2mm series as the master, every image of the 10 mm series will be displayed. This means that paging through multiple series simultaneously is possible with the Link tool, but images will be skipped, unless the series with the thinnest slice thickness is used as the master.

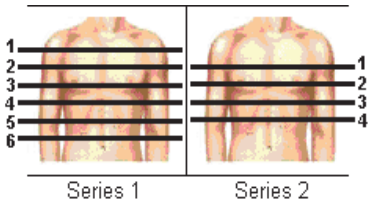


WARNING

Linking Series that Contain Different Body Parts

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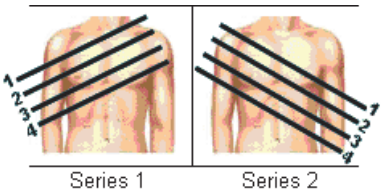
Series that contain different body parts or cover a larger/smaller region of the body can be linked. For example, a CT series that contain a CHEST-ABDOMEN-PELVIS might be linked with a CT series that contains only a CHEST. By navigating through the CT CHEST series, you will never be able to see the ABDOMEN-PELVIS of the other series. Conversely, by using the CHEST-ABDOMEN-PELVIS as the master series, you can look at the CHEST images side-by-side, as well as at the ABDOMEN-PELVIS images of the master series. This means that using the Link tool, you cannot go beyond the scope of the master. This might be obvious if the body parts are totally different like in the CHEST-ABDOMEN-PELVIS example, but sometimes they are the same, but they do not start at exactly the same location. In this case, you might miss a few slices.



WARNING

Linking Oblique Series

IntelliSpace PACS allows you to link oblique series. The goal is to provide users with the ability to link oblique series that are more or less in the same orientation. However, IntelliSpace PACS does not prevent you from linking obliques that have totally different orientation. This means that linking obliques that are not of roughly the same orientation leads to unexpected behavior in IntelliSpace PACS.



WARNING

Deleting studies is permanent, meaning that deleted studies cannot be recovered. Deleted images can be recovered. However, all presentation states, measurements, and annotations are lost. Also, if an image has been deleted after receiving a new Study UID, the image cannot be recovered. Be aware that deleted images may contain data that would render a different diagnosis.

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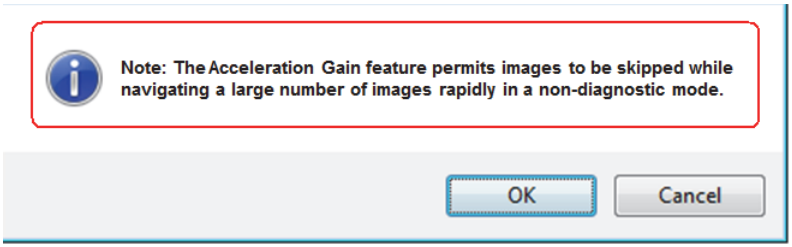
WARNING *Users with appropriate permissions should not assign new Study UIDs to studies that have not been confirmed to be complete (status is not designated "Complete").*

WARNING *If multiple users share the same User Preferences, IntelliSpace PACS cannot prevent the users from changing settings in each of the users' User Preferences.*

WARNING *In the Add DICOM Source dialog box for Color WW/WL Settings, enabling any non-zero deviation value can cause alteration of true colors. Attempting to select a non-zero deviation value will cause the message "Setting a deviation value other than 0 can alter true color values" to display. You should also exercise caution when using this feature with scanned-in images.*

WARNING *Coarse Fast Cine may skip images, depending on how far the mouse is from where the Fast Cine originally began.*

WARNING *When the Acceleration Gain option is selected, the cursor changes shape when a set of images is passed over and not shown to indicate that some image skipping is occurring. This is analogous to a flipping through the pages of a book to quickly get to the area of the book you want to begin to read. When you select this option, you must acknowledge the following message, which informs you that images may be skipped when navigating a large number of images. You control when skipping occurs by the rapidity with which you move the mouse. The cursor changes shape to indicate that images are being skipped during a non-diagnostic transversal of images.*


Note: The Acceleration Gain feature permits images to be skipped while navigating a large number of images rapidly in a non-diagnostic mode.
OK
Cancel

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2.2 Mobile Telephones and IT Equipment

This medical device software must be installed on appropriate IT equipment that complies with IEC standard 60950. Other electronic equipment exceeding the limits defined in IEC 60950, such as certain mobile telephones, could, under unusual circumstances, affect the use of the IT equipment and thus the medical device software.



WARNING

You should not allow any portable radio transmitting apparatus (such as mobile telephones) - whether switched on or off - in the vicinity of the IT equipment. Such apparatus could exceed IEC radiation standards and, under unusual conditions, interfere with the proper functioning of the medical device software. This could in extreme cases lead to clinical misdiagnosis, and/or loss/damage of patient data.

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3 Getting Started

When your System Administrator has assigned your IntelliSpace PACS username and password, you can access IntelliSpace PACS. Your IntelliSpace PACS System Administrator should ensure you can access the IntelliSpace PACS server and tell you which authentication system to log in to. Because IntelliSpace PACS is customized on a user-by-user basis, your interaction with IntelliSpace PACS (the patients you have access to, the tools available to you, and so on) may be different from that of other users.

WARNING

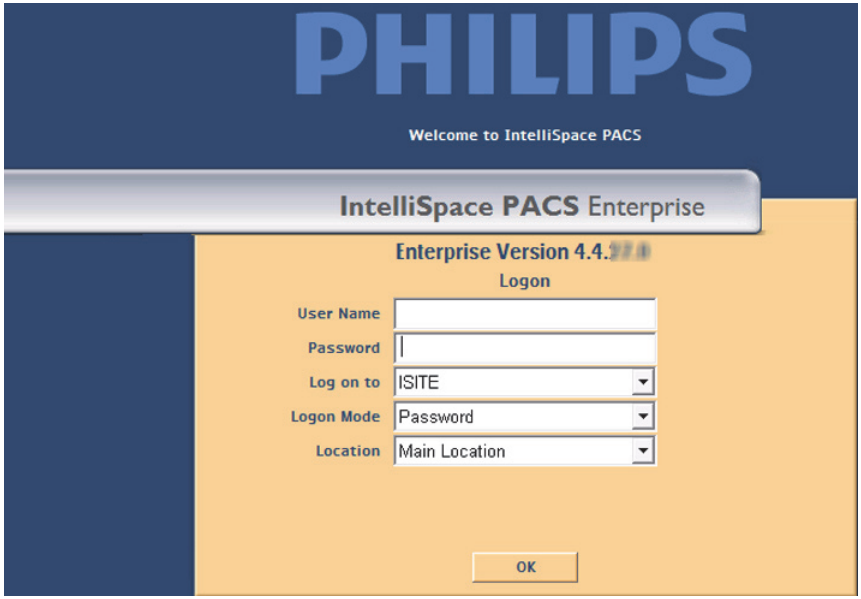
- ***Please adhere to your site security policy to establish strong passwords and take appropriate measures to secure the network environment to prevent access by unauthorized users and possible modification to patient data.***
- ***Each user is assigned a unique User ID and password. This prevents users from sharing the same personal folders, user preferences, and shortcuts and prevents one user from deleting or changing the user preferences and personal folders of other users. You should never share your User ID and password.***

IntelliSpace PACS requires a monitor color setting of 24 bits or higher. A message displays if you are using a lower bit rate. See 'Setting the Monitor Color Resolution' (see page 35).

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3.1 Logging on to IntelliSpace PACS

1. In the **Log in** screen, enter the user name and password provided by your System Administrator.



2. In the **Log on To** field, select the appropriate authentication scheme.
3. If support for more than one language is installed, select the desired language from the **Language** list.
4. Click **OK** or press **Enter**. Your controls and preferences are loaded and your name is displayed in the upper left corner of the screen.

NOTE

- ***Users are prevented from logging in after three unsuccessful login attempts.***
- ***IntelliSpace PACS Enterprise uses integrated login: when a user logs into the Windows domain as an administrator and then launches IntelliSpace PACS Enterprise, it automatically uses the Windows domain credentials to log the user into the application IntelliSpace PACS. However, when the user logs out of IntelliSpace PACS Enterprise but does not close the IntelliSpace PACS Enterprise window, anyone, regardless of their credentials, can log into IntelliSpace PACS***

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Enterprise using the cached adminstrator credentials. To prevent this from occurring, when an authorized user logs out of IntelliSpace PACS Enterprise, that user should also close the IntelliSpace PACS Enterprise application.

3.2 Setting the Monitor Color Resolution

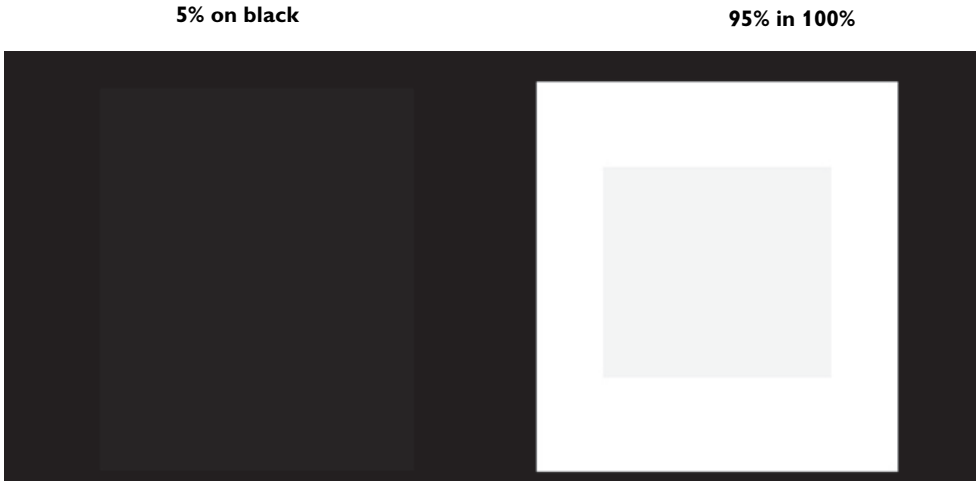
IntelliSpace PACS requires a monitor color setting of 24 bits or higher. If you are using a lower bit-rate, a message displays.

1. Right-click on your Windows desktop and select **Properties**.
2. In the **Display Properties** dialog box, click the **Settings** tab and then set the **Colors** section pull-down menu to 24 bits or higher.
3. Click **OK**. A message displays.
4. Click **OK** again to apply the new settings.

3.3 Monitor Calibration

Use the following image to calibrate your navigation console (not diagnostic) monitor.

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Adjust the brightness and contrast of your monitor until you can see all three squares simultaneously. Be sure that the ambient light where you are working isn't too bright.

3.4 Configuring Pixel Pitch for the Diagnostic Monitor

IntelliSpace PACS features a True Size zoom preset that is available from the hanging protocol or through a shortcut menu setting. True Size displays digital mammography images (for the same view of the same patient anatomy without consideration for magnification) in the same relative size even if these images are produced by different detector technologies with different inherent resolution or matrix size.

For True Size to be accurate, the Diagnostic Monitor pixel pitch must be configured properly in the Machine preferences. See 'Setting Display Monitor Preferences' (see page 393) for the other settings you make in the Machine preferences.

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To calibrate your monitors, you should be aware of monitor settings that could affect the native pixel pitch and the appearance of True Size. Examples of these settings are horizontal/vertical size, Pincushion, Pin Balance, and Trapezoid.

WARNING

- ***True Size should not be used as a measurement tool, since pixel pitch is often misleading on certain monitors.***
- ***Before making clinical decisions, you must ensure that the proportions of the image are close to real size proportions. Also, you should use the measurement, annotation, and image scale tools available in IntelliSpace PACS, rather than using physical rulers or other tools.***

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays. See 'Setting Display Monitor Preferences' (see page 393).
3. Click **Display Monitors**. The right side of the **Preferences** dialog box displays options for the display monitor(s). If there is more than one monitor, select the first monitor you want to configure from the list. The **Resolution** for the selected monitor displays. Each monitor has its own **Pixel Pitch** setting in the **Screen Settings** area.
4. Select the monitor's **Pixel Pitch** from the list, or enter a value (in mm) manually. To determine the monitor pixel pitch, refer to the monitor's technical specifications. If the monitor's resolution in the "Native Resolution" is defined by the factory, you should be able to use the Pixel Pitch value that is defined in the technical specifications. Be aware that any change in the manufacturer-defined pixel pitch will affect measurements.
5. If the following conditions are not met, True Size will not be applied:
   - The monitor's pixels must be square (so the horizontal pixel pitch is the same as vertical pixel pitch).
   - The image pixel spacing values is in mm, not pixels.
   - The image horizontal and vertical pixel spacing values should be equal, so the shape of the image pixel is square.

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6. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.
7. To configure another monitor, select it from the **Display Monitors** list.
8. Continue to configure monitors as desired.
9. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

3.4.1 True Size Verification

After configuring the monitor's Pixel Pitch, you must verify that the True Size setting behaves as expected. One way to verify this is to open an image that complies with the previously described requirements, and select the **True Size** zoom option. Once selected, the horizontal and vertical scales at the bottom and right side of the image should match a real-life ruler unit (meaning each division in the scale is 10 mm at lower zoom factors and 1 mm per division at higher zoom factors). Many variables can influence the pixel spacing values of the image during acquisition, such as distance from the plate, different depth of field, and so on.

WARNING ***Incorrect Pixel Spacing and Pixel Pitch values affect the accuracy of the True Size feature. Therefore, you should always make sure that the size of the image is as expected when reviewing a True Size zoomed image.***

3.5 Accessing Patients and Exams

Patient Lookup is the first screen displayed when you log in to IntelliSpace PACS. It allows you to quickly find patients (with or without associated exams) based on a combination of search criteria. See 'Finding and Managing Patient Information' (see page 63).

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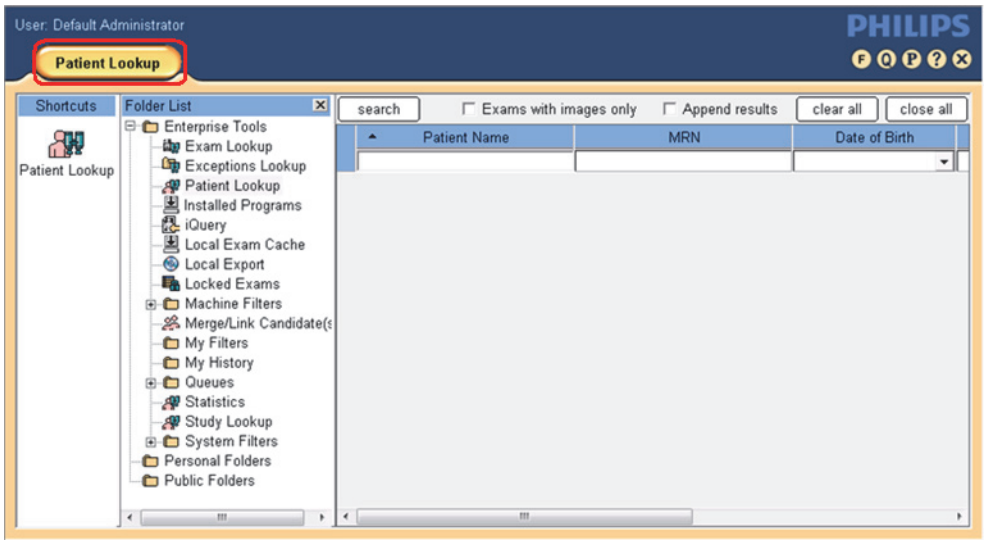


Figure 3.1 Patient Lookup

3.6 Accessing Online Help

1. Click the question mark icon on the Control Strip near the upper-right corner of the window.
2. Either type the word or phrase that you need information about and click **List Topics** and then click **Display**, or click the **Contents** tab and click on the desired topic, double-clicking the topic to display any sub-topics. Near the bottom of the **Search** tab, you can select the following options:
   - Search previous results (limits new search within the previous results)
   - Match similar words (expands results to include matches of similar words)
   - Search titles only (limits search to topic titles only)

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Figure 3.2 Accessing online help

3.7 Setting Preferences

Click the **P** icon on the Control Strip near the upper-right corner of the window. See 'Setting User Preferences' (see page 337), 'Setting System Preferences' (see page 355), and 'Setting Machine Preferences' (see page 391).



Figure 3.3 Setting preferences

3.8 Setting Federation Status

NOTE ***The "F" icon is not available in normal PACS deployment. This icon is visible only when Federation is deployed and enabled, and the user has the rights to use the Federation capability. For more information on Federation and its functions, see section 6.2 'Patient Lookup and Federation' on page 66.***

1. Click the **P** icon on the Control Strip.
2. In the User Preferences dialog, select **Automatically connect to federation**.
3. Click **Apply** and then click **OK**.
4. Log out of IntelliSpace PACS and then log back in to activate the Federation preference.

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5. The **F** icon on the Control Strip near the upper-right corner of the window should appear as a light-colored beige background.



Figure 3.4 Viewing Federation status

6. To disable Federation, click the **F** icon. The icon color will turn gray.
7. To enable Federation again, click the **F** icon. The icon color changes back to beige.

See section 6.2 'Patient Lookup and Federation' on page 66, for more information about the Federation icon and the significance of its color changes.

3.9 Viewing IntelliSpace PACS Version Information

Click the Philips logo on the Control Strip near the upper-right corner of the window to display an **About** screen that displays the IntelliSpace PACS version information.



Figure 3.5 Viewing IntelliSpace PACS version

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3.10 Logging Off

- Click the **X** icon on the Control Strip near the upper-right corner of the window. If you are viewing an exam, a message displays asking if you are sure you want to close all exam(s).



Figure 3.6 Log off icon

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4 Accessing IntelliSpace PACS Remotely

4.1 Overview

IntelliSpace PACS enables you to access patient exams stored at a main location from a remote site, such as your home or off-site location. To compensate for the slower connection speed of a WAN, DSL, ISDN, or 56K modem connection, you can select from several levels of compression and image quality adjustments. When required, you can still download a "full fidelity" (non-compressed) image, which is the highest quality image.

To use remote access, you select your connection method when you log into to IntelliSpace PACS. If your institution is a multi-site deployment, additional locations might be displayed in the **Workstation Location** list. These locations correspond to appropriate site names of your multi-site deployment. If you are not sure which location to select, or if you need clarification on multi-site configuration, contact your IntelliSpace PACS System Administrator.

You must be aware of the amount of compression in use when you view images and series in IntelliSpace PACS. Note that Hounsfield unit measurements are not correct unless the image you are measuring is at full fidelity.

You can use the following Workstation Location compression modes when logging in from an off-site location, depending on whether you are running IntelliSpace PACS Enterprise or IntelliSpace PACS Radiology:

- Main (no compression)
- Wide Area Network (WAN)
- DSL/cable modem
- ISDN/cable modem
- Teleradiology (most compression)

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4.2 Minimum Network Requirements

4.2.1 General Requirements

At the minimum, a switched 100Mb/s local area network (LAN) shall be provided. For Study acquisition scenarios that require STAT interpretation, Hardware (DICOM processors and storage modules) and Client Devices must reside on a contiguous 100Mb/s switched LAN. DSL, cable modem, satellite and other non-commercial-grade technologies should not be used due to high latency.

WARNING

- ***Issues including delays with image retrieval, delays in Study migration between servers/locations, and application responsiveness issues (pauses, halting) may be experienced when the PACS Service is used on a network that does not meet the Minimum Network Requirements.***
- ***Be aware that remote sites that do not connect directly to the main site and/or that connect with a sub-optimal bandwidth, can cause incomplete transfer of or unavailability of critical data at the time of diagnosis.***

4.2.2 Urgent Cases/Emergency Room and Availability

Depending on the urgency of a case, studies may need to be accessed quickly after acquisition for diagnostic interpretation to provide feedback to a requesting ER physician. An ER case typically needs to be read STAT, or immediately. If the study is at a remote site, any remote workstation pulling a study from that location over the WAN may be limited by the bandwidth and latency given the size of the study. In this scenario, the user's requirements (the radiologist) are the ability to view the study in full fidelity in near real-time or until the study has been transmitted in full to the workstation using local exam caching. Otherwise, the radiologist might need to wait until the study is migrated to the main location where a faster connection is available.

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Also, given the life-critical nature of these cases, uptime requirements and network quality of the WAN connection service provider should be considered. Service Level Agreements (SLAs) for the service providers need to be considered to ensure that the network remains up and available to meet patient care requirements.

4.3 Teleradiology Mode

Teleradiology Mode is the lowest connection speed available and is designed to be used when you connect to IntelliSpace PACS over a telephone line with a 56K modem. This mode uses the highest amount of compression to compensate for the extremely poor data transfer rate often experienced over a telephone line.

1. In the **Login** screen, enter your username and password.
2. From the **Workstation Location** list, select **Teleradiology**.
   - The supplied setting is **Main Location**. You may use this setting if you do not wish to use compression, but you should note that transmission times are increased and image quality transfer may fail if the available bandwidth is insufficient.
3. In **Teleradiology Mode**, IntelliSpace PACS displays a notification message warning that images are compressed and explaining the compression indicator. When you load an exam in this mode, IntelliSpace PACS displays the progress of the exam loading. The number listed is the percentage of the number of total images loaded.
4. To cancel this process at any time, click **Cancel**.

4.4 Image Quality Indicator

When images in other than full fidelity are displayed in IntelliSpace PACS, the quality of the image is marked with an icon in the lower right corner that represents the degree of compression for that image. There are two possible icons:

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- The **JPEG Lossy** icon is displayed when images are received by IntelliSpace PACS from a modality that are already compressed using the JPEG lossy compression.
- The **Compression Level** icon is displayed when IntelliSpace PACS has applied a higher compression to improve upload time to the client. In this case, you can improve the image quality to full fidelity by right-clicking and selecting **Full Fidelity** from the menu.

The **Compression Level** icon also includes text that gives further details about the compression levels in use. There are three different cases:

- iSyntax compression images display the word "Lossy" followed by the appropriate compression quality icon based on the quality factor or set to the percentage based on the compression ratio.
- Images using JPEG compression display "JPEG Lossy" followed by the compression icon that specifies the J-type compression level.
- Compacted images display "Lossy" followed by the compression quality icon that specifies the L-type compression level.

4.4.1 Improving Image Quality

To improve image quality to full fidelity in one step, right-click an image on the Canvas Page, and from the menu select **Full Fidelity**. See 'Introduction to the Canvas Page' (see page 195).

Shown below are the grades of compression.

Icon	Compression Level
	Grade one, highest level of compression. This is the initial compression level of images viewed when logged in with the Teleradiology setting.
	Grade two.This is the initial compression level of images viewed when logged in with the ISDN setting.
	Grade three. This is the initial compression level of images viewed when logged in with the Cable-Modem/DSL setting.

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Icon	Compression Level
	Grade four.
	Grade five. This is the initial compression level of images viewed when logged in with the Wide Area Network setting.
	Grade six.
	Grade seven, no compression (full fidelity). This is the initial and constant compression level of images viewed when logged in with the Internal Network setting.
	JPEG-type compression.
	IntelliSpace PACS lossy compression.
	Intermediate draw symbol.

4.4.2 Image Processing Effects

Data in IntelliSpace PACS full resolution is presented without loss, (that is, identical to the original data) except in the case where lossy compression is used, or image processing is applied. These cases are clearly indicated on the display through the following icons in the image pane:

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Icon	Indicates
	Lossy compression has been used on the data presented. There are six levels of compression, each represented by a different version of this icon.
	Some lossy process preceded data presentation (for example, the “lossy” flag set in the DICOM)
	Image source is a lossy JPEG image
	Image processing has been applied

In the case of image processing, data is altered to enhance some characteristic. This may or may not cause data loss, depending on the method chosen. For example, a median filter is a noise reducer and clearly causes data loss, while an edge detector enhances edges – thus altering, but not necessarily losing data. These methods are all documented in ‘Image Processing’ (see page 236), and are industry standard methods.

When intermediate resolution data is displayed, the markers still apply. However, in the case of uncompressed, unprocessed data, if the data is not presented pixel for pixel from the source data (that is, other than 100%), then some form of interpolation is used. This is a possible combination of subband filtering due to the wavelet representation used in the internal representation, and pixel replication, bilinear- or bicubic-interpolation at the display. These are also common, industry standard methods. The display indicates the degree of zooming, with 100% indicating pixel for pixel correspondence with the original data.

WARNING

Because of the pervasive use of lossy compression and other image processing methods in the medical industry (such as edge detection), it is at the discretion of the diagnostic viewer to treat these images as diagnostic.

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5 Program Layout

The basic layout elements in IntelliSpace PACS are the Control Strip, Folder List, and Shortcut Bar. When you first log on, the **Patient Lookup** page displays, allowing you to find patients and their exams. You can **Shift-click** to select contiguous patient names or **Ctrl-click** to select multiple, non-contiguous patient names.

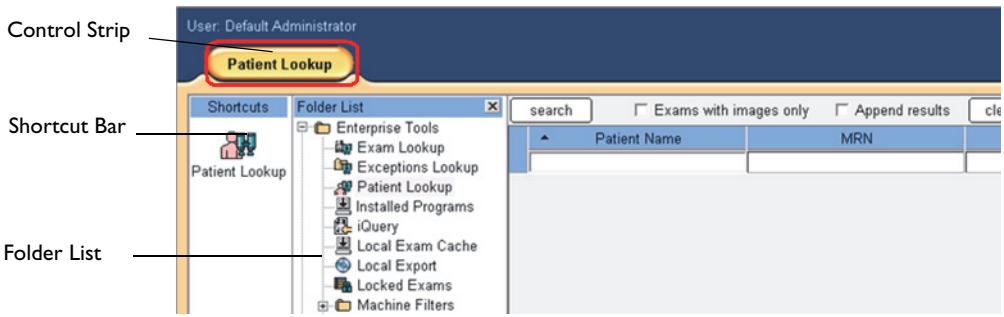


Figure 5.1 IntelliSpace PACS program layout

5.1 Control Strip

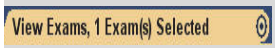
The Control Strip displays at the top of IntelliSpace PACS after you log in.



Figure 5.2 Control Strip

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It displays the name of the current user and the following:

Icon	Description
	A tab showing the current action. You can click this tab to return to this action from the Canvas page (for example, **Patient Lookup** or **My Filters**). You can select multiple, non-contiguous patients using **Ctrl-click**.
	This tab displays when you double-click on an exam in the worklist, displaying the Canvas Page. If you have viewed more than one patient's exams, you can right-click on the tab to select the patient whose exams you would like to view, or to select the **Close All Patient(s)** option. Click the icon on the right side of the tab to close the currently displayed exams. The patient's name, sex, birth date, patient ID, and referring physician are displayed below the tab.
	Icon for setting Federation status (displayed only when Federation is enabled and system is deployed in Federation mode). See 'Setting Federation Status' (see page 40).
	Icon to access the iExport Queue application (if you have the proper privileges). See 'iExport for DICOM Export' (see page 303).
	Icon to access the **Preferences** dialog box (always displayed).
	Icon to access the online help (always displayed).
	Icon to log off of IntelliSpace PACS (always displayed).
Low memory warning	If available memory falls below 50 MB for IntelliSpace PACS Enterprise or 128 MB for IntelliSpace PACS Radiology, a notification displays in the Control Strip. Users should contact their IT department to increase hardware components to meet their viewing needs.
	Displays an About box that displays the Philips end-user license agreement and information.

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5.2 Folder List

The Folder List provides access to various IntelliSpace PACS areas and tools. Folders are storage places for studies you would like to save. User folders are private to the user; public folders are shared by everyone who has permission to access public folders. You can use folders to save studies for reference later, or studies to share with a group of users. Folders can help solve workflow process, such as quality control or tumor board review sessions. Examples of folders include:

- **Tumor Board**: Physicians can create folders that allow them to save pointers to studies they want to review during a tumor board meeting.
- **Image Quality**: Radiologists who see an image quality acquisition problem or technique can mark the image with an annotation and save it as a Presentation State. They can then move it to a shared system folder marked "Image Quality Issues." A supervisor or PACS Administrator can review the folder throughout the day and work with the Technologist to resolve the issues.
- **Clinic**: In an orthopedic group, nurses can put studies in Public folders to make it easier for a group of physicians to access them.

If you have the proper privileges, you can create shortcuts for tools and folders. You can also create personalized folders that contain links to relevant clinical exams, by dragging and dropping. (Note that dragging and dropping an exam listing to a folder moves links to exams. It does not copy the exam or move data from one folder to the next.) See 'Adding Exams to Folders' (see page 55). You can also make patient information associated with exams in Personal Folders anonymous. See 'Making Patient Information Anonymous' (see page 56).

The Folder List contains the following folders that you cannot rename or delete:

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- **Enterprise/Radiology Tools**: The Tools folder contains the basic IntelliSpace PACS Enterprise or Radiology tools, depending on which application you are using. The list of tools is based on your preferences and user privileges. The complete list of IntelliSpace PACS Tools is displayed below. You cannot add folders to the Tools folder.
  - **Exam Lookup**: Allows you to find exams, based on a combination of search criteria. See 'Exam Lookup Overview' (see page 103).
  - **Exceptions Lookup**: Allows you to find exceptions, defined as exams whose DICOM information conflicts with information from the HIS/RIS or the IntelliSpace PACS database. See 'Exceptions Lookup Overview' (see page 171).
  - **Patient Lookup**: Allows you to find patients, based on a combination of search criteria. See 'Patient Lookup Overview' (see page 63).
  - **Resolved Exceptions**: Displays the **Resolved Exceptions** worklist, allowing you to view a list of all resolved exceptions. See 'Working with Resolved Exceptions' (see page 185).
  - **Installed Programs**: Displays the currently installed programs, such as the IntelliSpace PACS Volume Vision product. If the current version of Volume Vision is already installed, the **Install** button is inactive; if the current version is not installed, you can click **Install** to get the latest version. See 'Philips IntelliSpace Clinical Applications' (see page 283).
  - **iQuery**: Allows an authorized user to retrieve DICOM studies from your institution's digital archive and send them to IntelliSpace PACS. See 'iQuery for DICOM Study Retrieval' (see page 314).
  - **Local Exam Cache**: Allows you to save patient exams on your local machine for later review. This speeds up access to image data when running IntelliSpace PACS remotely.
  - **Local Export**: Allows you to burn CDs and DVDs of clinical exams with all of their related diagnostic reports and information. The resulting CD/DVD can include an embedded IntelliSpace PACS Media Viewer, allowing the user to examine all the clinical images and information without having to connect to the Internet or download the

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IntelliSpace PACS Viewer. See 'Using the Media Viewer' (see page 297) and 'Working with VIP Patient Exams in the Media Viewer' (see page 301).

- **Locked Exams**: Lists which exams are opened and locked, and by whom. Users with the proper privileges can unlock an exam on this worklist. See 'Viewing Locked Exams' (see page 120).
- **Machine Filters**: Contains the IntelliSpace PACS supplied machine filters and any system filters set up by your IntelliSpace PACS System Administrator. See 'Creating Filters' (see page 158).
- **Merge/Link Candidates**: A list of patients that are identified by the IntelliSpace PACS system as candidate pairs for patient linking and merging. See 'Merging Patient Records from the Same Organization' (see page 91).
- **My Filters**: While initially empty, this folder can contain all of your personalized search filters. You create filters in the **Preferences** dialog box (accessed by clicking the **P** button on the IntelliSpace PACS Control Strip) and directly from a worklist. Filters can be based on combinations of modality, body part, exam code, date, patient age, and other criteria. See 'Creating Filters' (see page 158).
- **My History**: Contains the last 100 exams you have viewed. Additional exam listing information includes Exam Marked Read by Me.
- **Queues:** If you have the proper permissions, this folder is available, and contains the iQuery and Federation queues, if Federation is activated. See 'Viewing the Federation Queue' (see page 72) and 'Viewing the iQuery Queue' (see page 320).
- **Statistics**: IntelliSpace PACS System Administrators have access to a full range of statistics and billing information from this folder.
- **Study Lookup**: Allows you to search for and open a study using the Study Instance UID (SUID) number. See 'Searching for Study Instance UIDs' (see page 328).
- **System Filters**: Contains the IntelliSpace PACS supplied system filters and any filters set up by your IntelliSpace PACS System Administrator. See 'Creating Filters' (see page 158).

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- **Personal Folders**: You can create private folders to create special collections of exam links for future reference. For example, you might want to save interesting cases for presentation or publication. You can add up to 25 sub-folders to each Personal Folder. A folder cannot contain more than 500 exam links and cannot be more than four levels deep. The contents of the Personal Folder are only visible to the user who created it. If you log out of IntelliSpace PACS on a certain computer and log back in on a different one, you will be the only one who can see your Personal Folders. Initially, the Personal folder is empty. You can add a comment to studies in Personal Folders. See 'Adding Comments to Studies in Personal or Public Folders' (see page 55). You can also make patient information associated with exams in Personal Folders anonymous. See 'Making Patient Information Anonymous' (see page 56).
- **Public Folders**: Like Personal Folders, Public Folders can be other folders you create, or links to clinical exams for other clinicians if you have permission to access public folders. The only difference between Personal and Public Folders is that the Public Folders can be viewed by all users. You can add a comment to studies in Personal Folders. See 'Adding Comments to Studies in Personal or Public Folders' (see page 55). You can also make patient information associated with exams in Public Folders anonymous. See 'Making Patient Information Anonymous' (see page 56).

5.2.1 Creating a New Folder

1. Right-click the folder in which you want to add the new folder.
2. From the menu, select **Add New Folder**.
3. A folder called **New Folder** is added. The name field is editable.
4. Enter the desired folder name.

5.2.2 Renaming a Folder

1. Right-click on a folder and from the menu, select **Rename**. The folder's name field becomes editable.
2. Enter the desired folder name.

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5.2.3 Showing and Hiding the Folder List

Do one of the following:

- Click the arrow icon in the Shortcut Bar header, or right-click in the **Shortcut Bar** and from the menu, choose **Show Folder List**. Or, right-click in the **Shortcut Bar** and from the menu, select **Hide Folder List**.
- Click the **X** on the Folder List header.

5.2.4 Adding Exams to Folders

You can organize and store links to specific exams by adding exams to folders.

Do one of the following:

- Drag and drop an exam listing to a folder, as you would in Windows Explorer.
- Right-click in the exam margin or on the exam in the timeline, and from the menu select **Add Exam to Folder**. The **Folder** dialog box displays. Navigate to the folder where you want to place the new exam and click **OK**.

5.2.5 Copying Exams from Folders to Folders

1. Select the exam that you want to copy to another folder.
2. Hold the **Ctrl** key while dragging the exam to the desired folder. The exam is copied, rather than moved.

5.2.6 Adding Comments to Studies in Personal or Public Folders

1. Open the Personal or Public folder that contains the study for which you want to add a comment.
2. Right-click on the study and choose **Properties** from the menu. The **Edit Exam Details** dialog box displays.
3. Enter the desired **Comment**.
4. Click **OK**.

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5.3 Making Patient Information Anonymous

When using IntelliSpace PACS for teaching presentations or demonstrations, you can make personal patient information associated with exams in Personal and Public folders anonymous. When you do this, IntelliSpace PACS substitutes actual patient information with randomly generated information for the patient name, MRN, and Accession number. Sex and birth date are not anonymized. You can view the properties of an anonymous exam after the random information has been generated, if you want to change any of this information. See 'Displaying or Editing Information about Anonymous Exam' (see page 58).

When anonymous exams are opened in the Canvas Page, the substituted patient information is displayed, instead of the actual patient information in the Patient History timeline and Relevant Exams area.

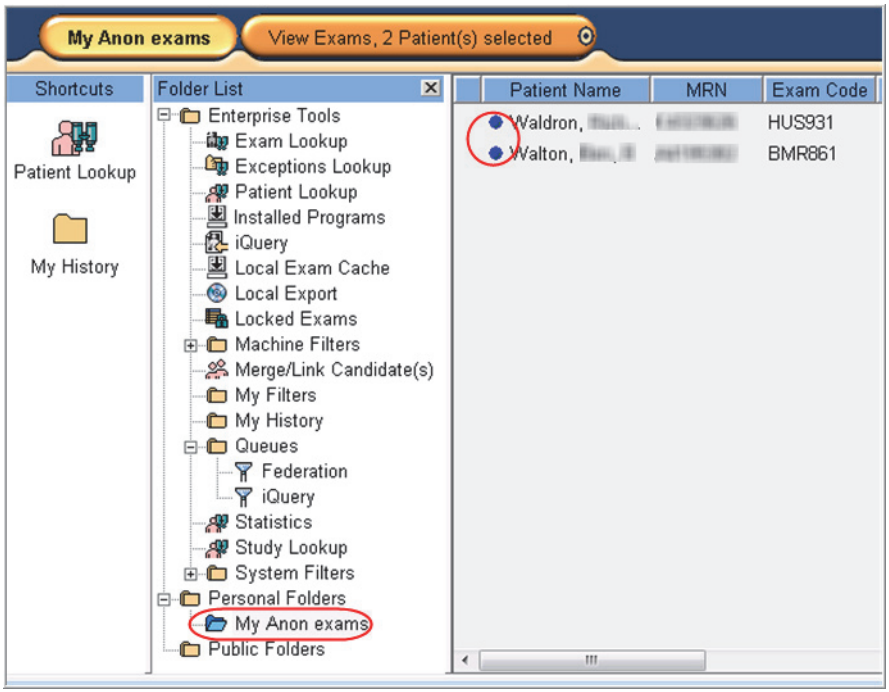
Note the following for anonymous exams:

- Certain features and menu items are disabled (including assigning a new study instance UID and deleting images).
- Screen overlays display the anonymous patient information.
- You can export exams with anonymous patient information to the Media Viewer and use the iExport tool for these exams. See 'Working with Anonymized Exams in the Media Viewer' (see page 301) and 'iExport for DICOM Export' (see page 303).
- You can enter comments (similar to exam notes) for anonymous exams by clicking on the icon in the Exam Margin on the Canvas Page. See 'Adding Comments to an Anonymous Exam' (see page 58).
- Patient information you make anonymous in IntelliSpace PACS is not anonymous in program extensions (such as IntelliSpace PACS Volume Vision) or other third-party applications.

NOTE ***If you have an exam opened as anonymous and then try to open the exam with the actual patient information, a message displays stating that the exam is already opened.***

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1. Drag the exams you want to make anonymous into the desired Personal or Public folder.
2. Right-click the folder that contains the exams you wish to make anonymous.
3. Select **Anonymous** from the menu. When selected, this menu item displays a check mark to the left of **Anonymous**. Anonymous exams are displayed with a blue dot to the left of the patient name, and the folder you right-clicked turns blue.



4. You can right-click the folder and click **Anonymous** again to deselect it and display the actual patient information for the selected exams.

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5.3.1 Displaying or Editing Information about Anonymous Exam

When exams in a folder have been made anonymous, you can view and change the properties for the randomly generated patient information. This information is available from:

- The exam in a folder that has been made anonymous
- The Media Viewer
- The iExport window

NOTE ***You can enter comments (similar to exam notes) for anonymous exams by clicking on the icon in the Exam Margin on the Canvas Page. See 'Adding Comments to an Anonymous Exam' (see page 58).***

1. When you have marked the folder as anonymous, right-click the exam and choose **Properties** from the menu. The **Anonymous Exam Details** dialog box displays.
2. View or edit the **First Name Middle Initial**, **Last Name**, **MRN**, **Accession #**, **DOB**, **Sex**, **Exam Date**, **Time**, and **Comments** for the anonymous exam.
3. Click **OK** when you are done.

5.3.2 Adding Comments to an Anonymous Exam

Comments allow IntelliSpace PACS users to communicate setup, non-diagnostic, or diagnostic information about a patient whose information has been made anonymous. They can range from generic comments about an exam, to preliminary findings ("wet reads") that other clinicians can use in their decision making.

If you have the proper privileges, you can add, view, and delete comments in the **Comments** pane of the **Clinical Information** dialog box, accessed by clicking the icon in the Exam Margin on the Canvas Page.

1. Open an anonymous exam.
2. From the Canvas Page, click the icon in the Exam Margin.
3. Click **New Comment**. The **Subject** area becomes active.

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4. Enter the subject of the comment. This appears in the summary when the comment is listed in the **Clinical Information** dialog box.
5. Type the comment. (You can also paste clipboard text from another application into the exam note using **Ctrl-V**.)
6. Click **Save Comment**. The comment is saved and summary information about the comment is displayed.

5.3.3 Viewing Comments for an Anonymous Exam

You select comments in the Comments window to view their content. The most recent comments are listed first. Summary information about the comments is displayed, including the date and time the comment was written, the author of the comment, and the subject. You can sort the notes by clicking on a column heading.

1. Open an anonymous exam.
2. From the Canvas Page, click the icon in the Exam Margin.
3. Select the comment you wish to view. The comment is displayed at the bottom of the dialog box.

5.3.4 Deleting Comments for an Anonymous Exam

1. Open an anonymous exam.
2. From the Canvas Page, click the icon in the Exam Margin.
3. Select the comment you wish to delete.
4. Click **Delete Comment**. A confirmation message displays.
5. Click **Yes** to delete the comment or **No** to cancel.

5.4 Working with VIP Patients

Certain patients, such as politicians, entertainers, and hospital employees, may be designated as VIPs (Very Important Persons) in IntelliSpace PACS. Accessing these patient records and performing all actions (such as opening exams, viewing images, copying exams to the Media Viewer, and so on) are audited. If a patient has a VIP status, a system-definable warning message is

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displayed, notifying the user that this is a sensitive patient record and displaying the patient name and MRN. For information on specifying the text for this message, see 'Setting General Preferences' (see page 356).

After you click **Yes** in the **VIP Warning** message, it does not display again during the same IntelliSpace PACS session for that patient. The message will display for other VIP patients in that session. When you start a new session and access the same sensitive patient record, the message displays again and the new activities you perform on this record are audited.

If you select more than one VIP patient for an action, the message lists all the patient names and MRNs of the selected VIP patients. If you click **Yes** in this message, every action for all the listed patients will be audited. You cannot select a subset of patients in this message.

If the **Automatically open next unread exam from active filter after marking read** check box is selected in the General User Preferences and you attempt to open an exam for a VIP patient after marking an exam as having been read, a warning is displayed asking you to acknowledge the VIP status of the patient whose exam is about to be opened. You can click **Yes** to proceed and read this exam or click **Skip** to move to the next unread exam. See 'Setting General Preferences' (see page 338).

5.5 Shortcuts Bar

The Shortcuts Bar allows you to quickly access your most frequently used folders, filters, and tools. The only time the Shortcuts Bar is not visible is when you view the Canvas Page. You cannot remove or hide the Shortcuts Bar, but you can resize it by clicking on the right border and dragging to the desired size.

5.5.1 Adding a Shortcut

1. Make sure the Folder List is displayed. If it is not, click the arrow icon in the Shortcut Bar header to display, or right-click in the Shortcuts Bar and from the menu, choose **Show Folder List**.
2. Do one of the following in the Folder List:

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- Drag an icon from the Folder List to the Shortcut Bar.
- Right-click an item and from the menu, select **Create Shortcut**.

If you add more shortcuts than can fit in the Shortcuts Bar, a button displays. Click this button to scroll through your shortcuts.

5.5.2 Selecting an Item from the Shortcut Bar

Click the item. The features for that item display in the area to the right.

5.5.3 Removing a Shortcut

Right-click the shortcut and from the menu, select **Remove from Shortcut Bar**.

5.5.4 Renaming a Shortcut

Right-click the shortcut and from the menu, select **Rename Shortcut**. The name field becomes editable. Enter the desired name and press Enter.

5.5.5 Resizing the Shortcut Area

Place your cursor on the right divider of the Shortcuts Bar and drag the divider to the desired size.

5.6 Shortcut Groups

You can organize your shortcuts into shortcut groups. For example, you can create a shortcut group called “Filters” where you place all your filter shortcuts. You can add as many shortcut groups as you want. As you add groups, they are stacked in the Shortcut Bar. You can also drag items from the Folder List into a shortcut group.

5.6.1 Creating a Shortcut Group

1. Right-click on the body of the Shortcuts Bar and from the menu, select **Add New Group**. An editable text field called **New Group** is displayed at the bottom of the Shortcut Bar.

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2. Enter a name for the new shortcut group and press Enter.
3. To access the shortcut group, click the header.

5.6.2 Renaming a Shortcut Group

1. Right-click the shortcut group name and from the menu, select **Rename Group**. The name field becomes editable.
2. Enter the desired name and press **Enter**.

5.6.3 Removing a Shortcut Group

1. Right-click the shortcut group name and from the menu, select **Remove Group**. A confirmation message displays.
2. Click **Yes**. Note that when you remove a group, you lose all the shortcuts in that group.

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6 Finding and Managing Patient Information

6.1 Patient Lookup Overview

Patient Lookup is the first screen displayed when you log in. IntelliSpace PACS allows you to uniquely identify a person and track their care as they enter an organization and become a patient. You use the **Exam Lookup** to find and manage exams (see 'Exam Lookup Overview' (see page 103) and the **Exception Lookup** (see 'Exceptions Lookup Overview' (see page 171) to find and manage exceptions. You can view and search for exceptions in the **Patient Lookup** (see 'Viewing Exceptions in the Patient Lookup' (see page 79).

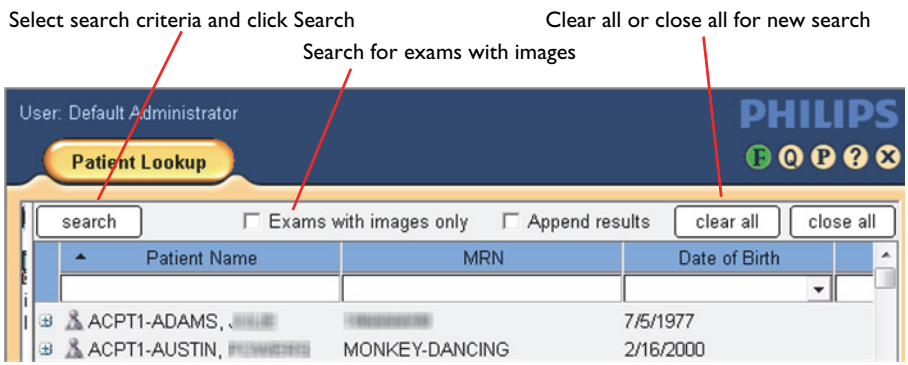


Figure 6.1 Patient Lookup

Because healthcare organizations can vary significantly (from single hospitals, to an integrated delivery network consisting of multiple hospitals, imaging centers, or groups of primary care clinics), a person can have multiple patient identifiers. When this occurs, healthcare organizations may implement a Master Patient Index (MPI) system to guarantee the uniqueness of a person with multiple patient identifiers in those organizations. See 'Master Patient Index and Patient Demographics' (see page 75).

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IntelliSpace PACS maintains its own database of Organization IDs, Persons, and Patients. Each Person is associated with one or more Patients, and each Patient has an identifier (for example, an MRN and an Organization ID). The way the database of Person and Patient records gets created depends on how the IntelliSpace PACS database is set up and populated.

WARNING

When running a query using a patient's MRN, it is possible that the non-numeric characters may be stripped from the MRN, possibly causing a mismatch of patient data between two or more patients. Make sure you validate the MRN against the patient name to ensure the returned patient data matches the patient you are looking for.

You can quickly find patients (with or without associated exams) based on a combination of search criteria. Patients whose records are based solely on exception studies are not displayed. You can search for patients based on any combination of the following. The search criteria in bold below must be displayed at all times:

- **Patient Name**
- **MRN**
- **Date of Birth**
- Social Security Number (see Note below)
- Organization
- Sex

You can set a General User Preference to show and search for exceptions in the Patient List. See 'Setting General Preferences' (see page 338) and 'Viewing Exceptions in the Patient Lookup' (see page 79).

If you do not specify search criteria, IntelliSpace PACS displays the patient information that you can access that is associated with the most recent 200 exams. If additional patients match your criteria, the most recent patients are displayed with a message indicating that additional patients match your criteria. To find these additional patients, narrow your search by adding additional criteria. The System Administrator can set the maximum number of displayed exams up to 1,000, but the supplied value is 200 exams.

When a list of patient names is displayed, you can do the following:

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- View and open exams: See 'Viewing Exam Information' (see page 76)
- Select patients to link or merge: See 'Linking Patient Records from Different Organizations' (see page 97) and 'Merging Patient Records from the Same Organization' (see page 91)
- Right-click to display a menu with actions
- Rearrange and select certain search criteria columns to hide or display: See 'Rearranging Patient Lookup Columns' (see page 81)
- **Shift-click** to select contiguous patient names or **Ctrl-click** to select multiple, non-contiguous patient names
- **Shift-click** to select contiguous exams or **Ctrl-click** to select multiple, non-contiguous exams

NOTE ***You cannot view canceled exams in the Patient Lookup, but you can view these exams in the Exam Lookup, My Filters, System Filters, and Machine Filters. See 'Finding and Managing Exam Information' (see page 103) and 'Filtering Worklists' (see page 149).***

PACS Administrators can set a System Preference to specify which columns are displayed in the Patient Lookup. See 'Setting Patient Columns Preferences' (see page 389). The following columns can be displayed or hidden:

- Organization
- Sex
- SSN (see Note below)

NOTE ***If the BSN (Burger Service Number) feature is enabled on the IntelliSpace PACS server, the SSN field is replaced with the BSN field. The BSN (Burger Service Number) feature is only available for IntelliSpace PACS sites in The Netherlands.***

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6.2 Patient Lookup and Federation

Federation is the joining of two or more independent PACS to allow clinicians to have a more complete view into a patient's history. It links disparate systems or sites with multiple iVaults, allowing a user logged into one iVault to see the same patient data in another iVault or another vendor's PACS.

Federation is available to sites that have the presence of a single patient identifier between the individual PACS; this means that the Patient ID (MRN) is issued consistently in all participating sites, and a person has the same MRN in all sites participating in the federation. However, if the federation does not have a uniform scheme for issuing MRNs, there are potential safety issues where an MRN from one organization within the federation matches the MRN of a different person in a second organization within the same federation. Thus, images and patient information might be incorrectly assigned to the wrong person.

WARNING ***It is the customer's responsibility to make sure patients have unique patient identifiers (MRNs) within a federation.***

The Federated layer allows the following:

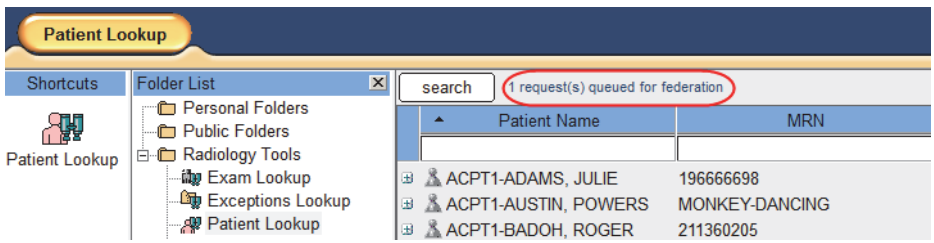
- iVaults and third-party PACS can form a union, with shared authorization and viewing privileges.
- A single, combined timeline for patients is provided, including studies that exist in multiple PACS systems.
- Enables physicians to access a current study from their local system and then access prior studies from any location in the Federation for comparison.
- Supports a heterogeneous environment: leveraging IHE standards when the appropriate systems are in place, and utilizing more traditional methods when they are not.
- If the user has permission to view patients and exams in the local PACS system, then the federation layer assumes that user has the right to view patients and exam in other PACS systems as well.

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If your PACS system is part of a federation, you will see some additional icons and messages in the Patient Lookup screen. When you click **Search** in the Patient Lookup pane, the color of the **F** icon in the Control Strip may change color, depending on the search results. When Federation is activated, the default color of the **F** icon is light beige/tan, the same color as the other icons in the Control Strip. See the following table for an explanation of the different colors for this icon.

Color of F Icon	Description
	Appears as light tan/beige. Federation is activated.
	Appears light gray. Federation has been de-activated by the user for that same client instance.
	Appears green. Federation is active and functioning properly.
	Appears amber (yellow-orange). The message "Some locations in the federation could not be reached" displays in the Control Strip, meaning that Federation did not get a response from all sites within the Federation, but some sites did respond.
	Appears red. The error message "An error occurred when accessing the federation" displays in the Control Strip, meaning that the Federation query did not go through. Users will only see exams from their local PACS.

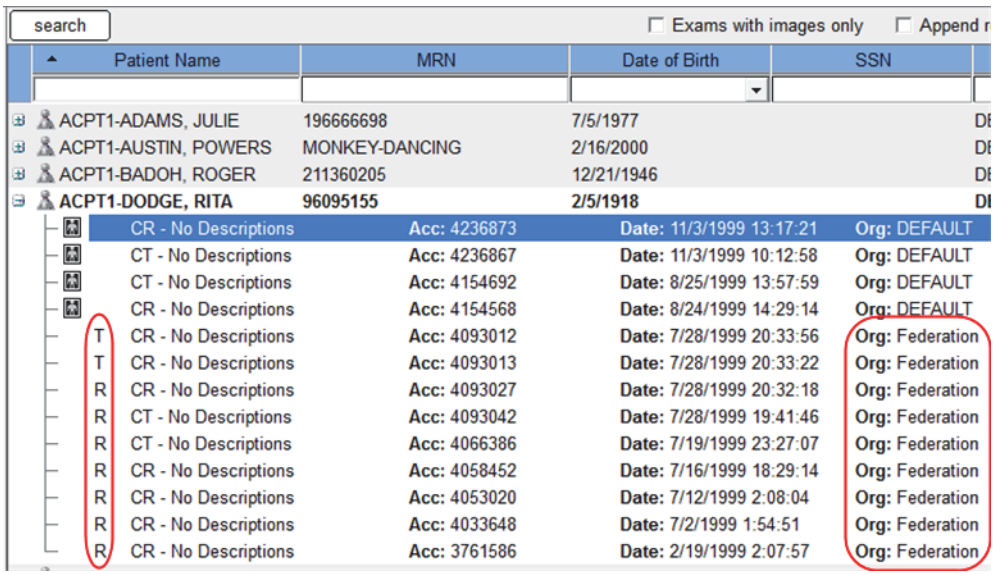
In Patient Lookup, when you click the **+** sign next to a patient's name to display the list of available exams for that patient, a message appears next to the Search button.



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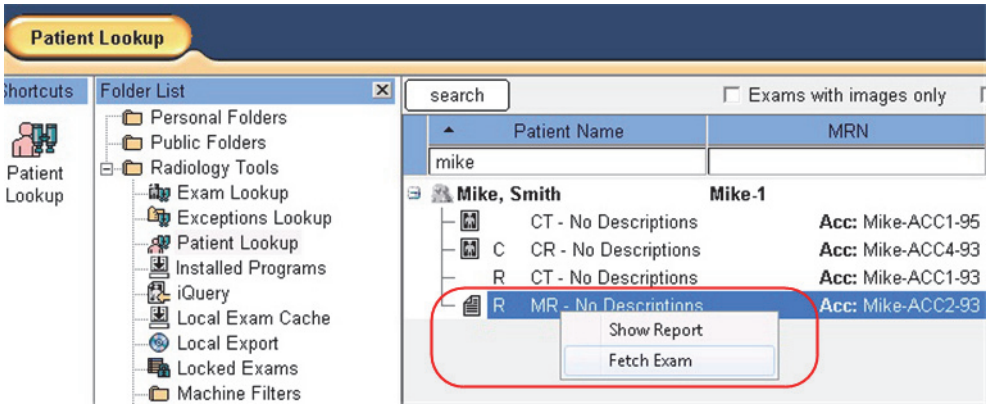
If you click several **+** signs in rapid succession, the number of requests displays as that same number of **+** signs clicked. For example, if you click three **+** signs in the patient list quickly, the message will read as **3 requests queued for federation**.

As exams are downloaded from the federation, a letter marker is added to the left of the modality type and the exam icon is not displayed. In addition, the organization will display as **Federation**.

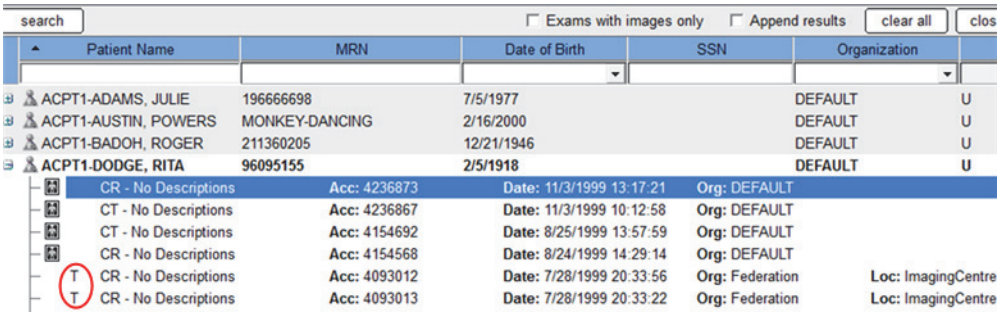

search
Exams with images only
Append r
Patient Name
MRN
Date of Birth
SSN
ACPT1-ADAMS, JULIE 196666698 7/5/1977
ACPT1-AUSTIN, POWERS MONKEY-DANCING 2/16/2000
ACPT1-BADOH, ROGER 211360205 12/21/1946
ACPT1-DODGE, RITA 96095155 2/5/1918
CR - No Descriptions Acc: 4236873 Date: 11/3/1999 13:17:21 Org: DEFAULT
CT - No Descriptions Acc: 4236867 Date: 11/3/1999 10:12:58 Org: DEFAULT
CT - No Descriptions Acc: 4154692 Date: 8/25/1999 13:57:59 Org: DEFAULT
CR - No Descriptions Acc: 4154568 Date: 8/24/1999 14:29:14 Org: DEFAULT
T CR - No Descriptions Acc: 4093012 Date: 7/28/1999 20:33:56 Org: Federation
T CR - No Descriptions Acc: 4093013 Date: 7/28/1999 20:33:22 Org: Federation
R CR - No Descriptions Acc: 4093027 Date: 7/28/1999 20:32:18 Org: Federation
R CT - No Descriptions Acc: 4093042 Date: 7/28/1999 19:41:46 Org: Federation
R CT - No Descriptions Acc: 4066386 Date: 7/19/1999 23:27:07 Org: Federation
R CR - No Descriptions Acc: 4058452 Date: 7/16/1999 18:29:14 Org: Federation
R CR - No Descriptions Acc: 4053020 Date: 7/12/1999 2:08:04 Org: Federation
R CR - No Descriptions Acc: 4033648 Date: 7/2/1999 1:54:51 Org: Federation
R CR - No Descriptions Acc: 3761586 Date: 2/19/1999 2:07:57 Org: Federation

- The marker **R** displays to show that remote exams have been identified in the federation.
- Right-click the Remote Exam and the shortcut menu displays the options
  - **Show Report** – only if a report is present for the remote exam; a gray report icon will display to the left of the **R** marker.
  - **Fetch Exam** – select this option to have the exam fetched and then cached locally.

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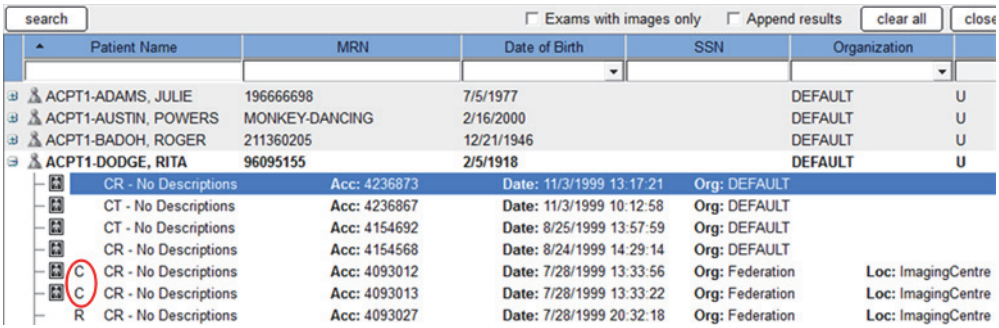


- The marker **T** displays when the exam is in the process of being transferred from the federation to the local PACS.



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- The marker **C** displays when the exam has already transferred and is cached locally. You cannot open an exam marked "C" in the canvas page; you must first open a local exam as the main exam, and then open the cached exam as a prior.

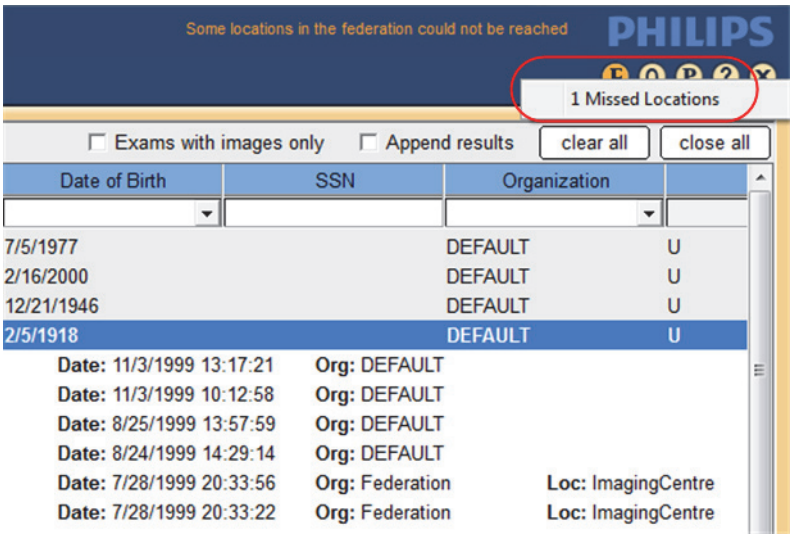

search
Exams with images only
Append results
clear all
close
Patient Name
MRN
Date of Birth
SSN
Organization
ACPT1-ADAMS, JULIE 196666698 7/5/1977 DEFAULT U
ACPT1-AUSTIN, POWERS MONKEY-DANCING 2/16/2000 DEFAULT U
ACPT1-BADOH, ROGER 211360205 12/21/1946 DEFAULT U
ACPT1-DODGE, RITA 96095155 2/5/1918 DEFAULT U
CR - No Descriptions Acc: 4236873 Date: 11/3/1999 13:17:21 Org: DEFAULT
CT - No Descriptions Acc: 4236867 Date: 11/3/1999 10:12:58 Org: DEFAULT
CT - No Descriptions Acc: 4154692 Date: 8/25/1999 13:57:59 Org: DEFAULT
CR - No Descriptions Acc: 4154568 Date: 8/24/1999 14:29:14 Org: DEFAULT
C CR - No Descriptions Acc: 4093012 Date: 7/28/1999 13:33:56 Org: Federation Loc: ImagingCentre
C CR - No Descriptions Acc: 4093013 Date: 7/28/1999 13:33:22 Org: Federation Loc: ImagingCentre
R CR - No Descriptions Acc: 4093027 Date: 7/28/1999 20:32:18 Org: Federation Loc: ImagingCentre

NOTE ***Third-party plug-ins cannot access remote exams.***

Besides the letter markers (R, T, C), the organization displays as **Federation**, the name of the remote location displays, as does the size of the exam.

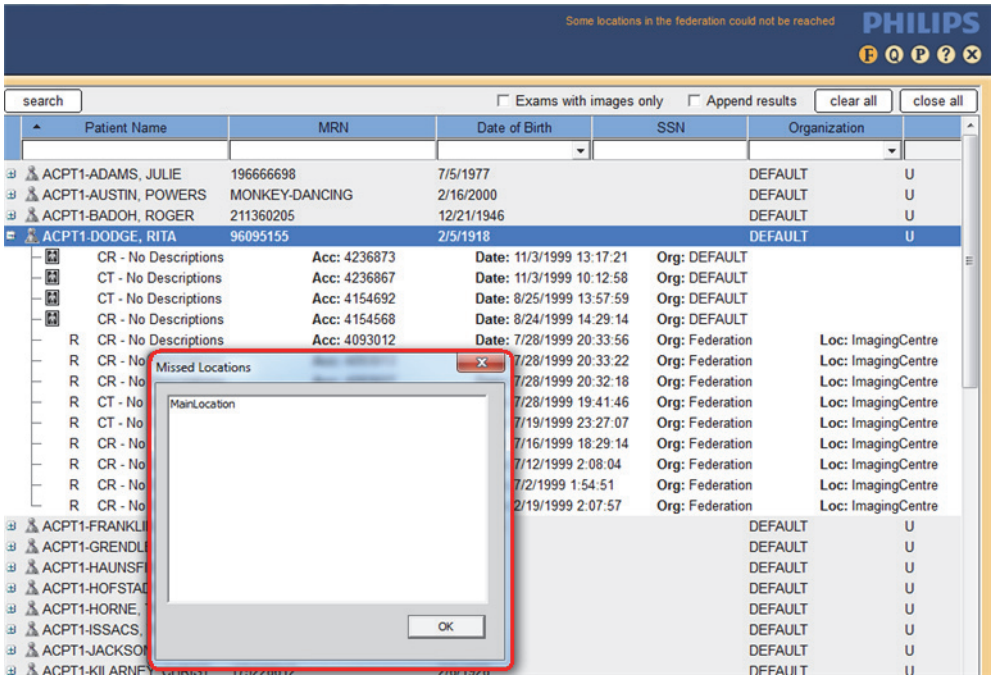
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When the Federation icon is amber, you can right click the icon and get a context menu that tells you how many locations are missing.



Clicking **Missed Locations** opens the **Missed Locations** pop-up, which displays the name(s) of each missed location. Once you have viewed the information, click **Close** to close the dialog.

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Some locations in the federation could not be reached
PHILIPS
search
Exams with images only
Append results
clear all
close all
Patient Name
MRN
Date of Birth
SSN
Organization
ACPT1-ADAMS, JULIE 196666698 7/5/1977 DEFAULT U
ACPT1-AUSTIN, POWERS MONKEY-DANCING 2/16/2000 DEFAULT U
ACPT1-BADOH, ROGER 211360205 12/21/1946 DEFAULT U
ACPT1-DODGE, RITA 96095155 2/5/1918 DEFAULT U
CR - No Descriptions Acc: 4236873 Date: 11/3/1999 13:17:21 Org: DEFAULT
CT - No Descriptions Acc: 4236867 Date: 11/3/1999 10:12:58 Org: DEFAULT
CT - No Descriptions Acc: 4154692 Date: 8/25/1999 13:57:59 Org: DEFAULT
CR - No Descriptions Acc: 4154568 Date: 8/24/1999 14:29:14 Org: DEFAULT
R CR - No Descriptions Acc: 4093012 Date: 7/28/1999 20:33:56 Org: Federation Loc: ImagingCentre
Missed Locations
MainLocation
OK

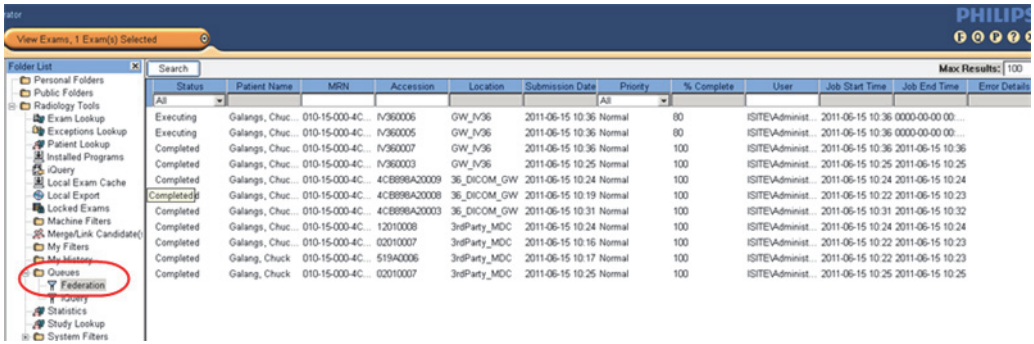
6.2.1 Viewing the Federation Queue

When exams are in the process of being transferred from the Federation to the local system, you can click **Queues** in the Folder list, and then click **Federation** to view the status of the exams being transferred. Note that the Federation queue is only visible when you have the View Queue and Manage Queue permissions.

NOTE ***The maximum number of exams that can be displayed in the Federation queue is 100. This number displays in the Max Results: field in the upper right corner below the Control Strip.***

The following fields display in the Federation queue:

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- **Status:** The Status field is editable, in that you can click the dropdown arrow and then select a status to further narrow the query. The available options are:
  - Submitted: the query has been submitted and is waiting to execute the transfer
  - Executing – the transfer of the exam is in process
  - Completed – the transfer of the exam is complete
  - Cancelled – you can select this option to change the status of an exam only if the exam is in the Submitted state.
  - Failed – the exam failed to transfer
- **Patient Name:** name of the patient
- **MRN:** MRN for the patient
- **Accession:** Accession # of the patient's exam (maximum length is 20 characters)
- **Location:** Federation location where the original exam resides
- **Submission:** date the query was submitted
- **Priority:** This field can be set only when the exam is in the Submitted state. Options are:
  - Normal: default value
  - Urgent
  - Stat

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- **% Complete:** Displays how far along in the transfer process an exam is
- **User:** the person who submitted the query
- **Job Start Time:** the time the job execution started for the first time
- **Job End Time:** the time when the job execution completed or Failed.
- **Error Details:** Gives the details of any errors.

The exams in the Federation queue stay in the queue until you delete them. To delete one or more exams in the queue, select them, right-click, and then click **Delete**.

NOTE ***Requests that are in the executing state cannot be deleted.***

For more information about Federation and the Canvas Page, see 'Federation and the Patient History Timeline' (see page 199).

6.3 Searching for Patients

1. If it isn't already displayed, select **Patient Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. Enter the desired search criteria.
3. If you only want to find patients with exams that have images, select the **Exams with images only** check box.
4. Press **Enter** or click **Search**. A list of patients who match your search criteria is displayed. If no patients match, IntelliSpace PACS displays a message in the Control Strip.

NOTE ***If you do a new search, the old results are removed unless you select the Append results check box or you expanded a patient's record to display that patient's exam list. See 'Appending Patients to an Existing List' (see page 81).***

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6.4 Master Patient Index and Patient Demographics

In a PACS system, there are typically three methods for combining data driven from disparate patient management systems into a single, comprehensive patient record:

- **Master Patient Index (MPI):** MPI functionality is typically used by larger healthcare organizations. Using an MPI allows organizations to bring disparate patient management systems together under a single umbrella. The primary benefit to an MPI is the ability to maintain a comprehensive patient record, even across disparate patient management systems where patients may have demographics that are dissimilar enough to each other that they would not be combined by a PACS-driven linking algorithm.
- **PACS-driven Linking:** Upon receipt of an HL7 message, which creates a patient, PACS uses an algorithm that compares demographics to extant patients in the PACS and automatically builds a link between the disparate patient records when the demographics match sufficiently. See 'Linking Patient Records from Different Organizations' (see page 97).
- **Manual Linking/Merging:** A customer may manually link patient records in the PACS to create a single history. See 'Resolving Merged or Linked Patient Records' (see page 86) and 'Using the Merge/Link Candidates List to Merge or Link Patients' (see page 88).

IntelliSpace PACS supports organizations that use an MPI as well as those organizations who do not use an MPI. The following are features of IntelliSpace PACS' support of MPI:

- Receipt of Master Patient Index via the HL7 interface is supported.
- IntelliSpace PACS provides configuration to allow control over whether or not demographics changes to a local patient can be applied to the MPI patient via the HL7 feed.
- IntelliSpace PACS allows MPI to be added to a patient record upon either creation of the patient record in IntelliSpace PACS or at a later date.

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- IntelliSpace PACS provides the ability to search for patients in the graphical user interface (GUI) via MPI when the capability to search by Medical Record Number (MRN) is provided in the MPI organization (Enterprise).

6.5 Viewing Exam Information

You can view a summary of a patient's exams in a list of patients. The following information displays for each exam, starting with the most recent:

- Modality type
- Exam description
- Accession # (maximum length is 20 characters)
- Date and time of order/exam (if no studies have been received) or of studies if they have been received
- Organization (ORG) in which the exam was created

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One of the following icons display next to the exams. If there is no icon, no images are available for the exam.

Icon	Description
	Image(s) available
	Exam is scheduled
	Report is available for exam
No icon	No images are available

1. Search for and display a patient or list of patients.
2. Click the plus (**+**) sign to the left of a patient's name. If the patient has associated exams, they display below the name, with the most recent exam displayed first.
3. Double-click on an exam to open it, or right-click to display a menu with various actions, including **Create Exam** and **View Exam Notes**. To open an exam without locking it, press and hold the **Alt** key while double-clicking on the exam.
4. Click the minus (**-**) sign to close the list of exams. You can also click **Close All** to close all displayed exams in a list of patients.

6.5.1 Searching for Patients by Name

You can search for patients by entering their last and first name or by using a wildcard search. For example, to find patient Doe, John you can search for the full name (Doe, John), full last name and partial first name (Doe, J) or partial last name (D). There is also a wildcard search option that allows you to search on a partial last name and "%" and partial or full first name (for example "D%, Joh").

1. If it isn't already displayed, select **Patient Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).

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2. Enter all or part of the patient's last name followed (optionally) by a wildcard character (%), a comma (,) and all or part of the first name (for example, “Sm%, J” will match “Smith, Joyce” and “Smithy, Jim”).
3. Click **Search** or press **Enter**. Patients who match the name search criteria are displayed.

6.5.2 Searching for Patients by Identifier

If two or more healthcare organizations want to integrate their systems, they can use an MPI patient identifier to enforce the uniqueness between organization identifiers, and to link patients across organizations. IntelliSpace PACS supports customers who currently use MPIs as well as those who don't use MPI now, but plan to. The ability to search for patients by MRN or MPI number lets you use IntelliSpace PACS to link patients with different MRNs together under one MPI.



WARNING ***When running a query using a patient’s MRN, it is possible that the non-numeric characters may be stripped from the MRN, possibly causing a mismatch of patient data between two or more patients. Make sure you validate the MRN against the patient name to ensure the returned patient data matches the patient you are looking for.***

1. If it isn't already displayed, select **Patient Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. Enter all or part of the name or number of the patient identifier (usually known as a Medical Record Number (MRN) but sometimes known as a department ID). You do not need to enter leading zeros or the rightmost characters for MRN numbers. You can also enter a Person Identifier (Master Patient Index or MPI) that identifies a person across multiple healthcare organizations, each of which may know this person as a patient.
3. Click **Search** or press **Enter**. Patients who match the identifier search criteria are displayed.

6.5.3 Searching for Patients by Other Criteria

1. If it isn't already displayed, select **Patient Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).

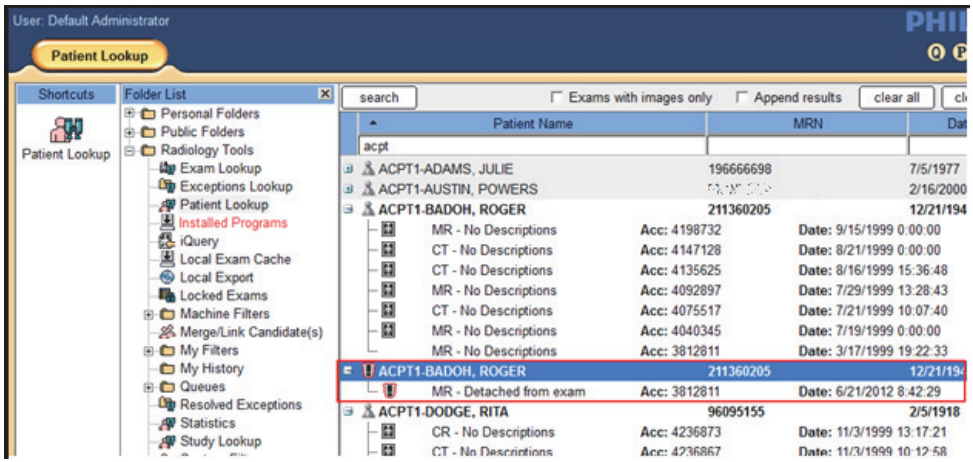
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2. Enter the patient's **Date of Birth**, **Social Security Number**, select an **Organization**, or select the **Exams with images only** check box.
   - **Date of Birth**: Enter the date or click the button in the field to select the date from a calendar control. Use **Ctrl-X** or the **Backspace** key to clear the date field.
   - **Social Security Number**: Enter the exact Social Security Number (SSN). The SSN cannot be more than 50 characters.
   - **Organization**: Select the name(s) of the organization(s). If you search for patients in a specific organization, the patients in that organization are displayed, as well as all exams for patient records that are linked to the organization (when the patient record is expanded by clicking on the plus icon). If you don't specify an organization, linked patients are displayed as separate list items in their respective organizations. Each list of patients displays all exams from all linked patient records showing under it.
   - **Exams with images only**: Select this check box if you only want to find patients with exams that have images.
3. Click **Search** or press **Enter**. Patients who match the search criteria are displayed.

6.6 Viewing Exceptions in the Patient Lookup

1. Verify that the General User Preference **Show Exceptions in Patient List** has been set.
2. If it isn't already displayed, select **Patient Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
3. Enter the desired search criteria.
4. Press **Enter** or click **Search**. A list of patients with exams and exceptions who match your search criteria is displayed, with an exclamation mark icon to the left of the patient name. Patients with exams are listed first. Exceptions with the same name as patients are listed after the last patient name. If no patients match, a message displays in the Control Strip.

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5. Double-click the exception to open it in the Canvas Page.

   Note the following:

   - If you do a new search, the old results are removed unless you select the **Append results** check box or you expanded a patient's record to display that patient's exam list.
   - By design, the top 200 exceptions are displayed.
   - There is no context (right-click) menu for exceptions in the Patient Lookup.

6.7 Clearing a List of Patients

If you have a list of patients displayed, you can clear the patients in the list by starting a new search or by clicking **Clear All**.

- With patients displayed in the **Patient Lookup**, click **Clear All**. All names in the list are removed.

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6.8 Closing a List of Patients

If you have exams displayed in the list of patients, you can close the exams individually by clicking the - icon to the left of the patient name. You can also close the exams for all patients in the list at the same time.

With patients and exams displayed in the **Patient Lookup**, click **Close All**. The exams for all patients in the list are closed, so that only the patient names are listed.

6.9 Showing or Hiding Patient Lookup Columns

You can show or hide any **Patient Lookup** columns except **Patient Name**, **MRN**, and **Date of Birth**.

1. Right-click in the column area, above the list of patient names.
2. Select the columns you want to show or hide. Shown columns are checked; hidden columns are unchecked.
3. Repeat steps 1 and 2 as required.

6.10 Rearranging Patient Lookup Columns

You can click and drag **Patient Lookup** columns to rearrange their order, except for **Patient Name** and **MRN**. This allows you to customize the order in which patient information is displayed.

Click and drag a column to the position you want, and release the mouse button.

6.11 Appending Patients to an Existing List

You can use **Append results** to build a list of patients by specifying different search criteria. For example, you can search for two different MRNs, or to find two patients you wish to link or merge.

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1. If it isn't already displayed, select **Patient Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. Search for the first set of patients using one set of search criteria.
3. When the list of patients is displayed, select the **Append results** check box and enter the next set of search criteria.
4. Click **Search** or press **Enter**. The new search results are added to the original list.

6.12 Sorting Results

The list is automatically sorted by patient name in alphabetical order.

Click the blue column heading that you want to sort by. An arrow appears in the column heading to display whether the order is ascending (A-Z or 1-9) or descending order (Z-A or 9-1). To reverse the order, click the same column heading again.

6.13 Patient Management Overview

IntelliSpace PACS includes the following features you can use to manage patient records. You access these features by right-clicking over a patient name in the **Patient Lookup** and selecting an option from the menu. A separate set of actions is available when you right-click on an exam instead of a patient. See 'Viewing Exam Information' (see page 76).

- **Export via DICOM**: See 'iExport for DICOM Export' (see page 303)
- **Create Patient**: See 'Creating Patient Records' (see page 83)
- **Edit Patient**: See 'Editing Patient Records' (see page 84)
- **Delete Patient**: See 'Deleting Patient Records' (see page 85)
- **Link Patients**: See 'Linking Patient Records from Different Organizations' (see page 97)
- **Merge Patients**: See 'Merging Patient Records from the Same Organization' (see page 91)

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- **Create Exam**: See 'Creating Exams' (see page 99)

You can also display a list of potential duplicate patient records to merge or link in the **Merge/Link Candidate(s)** list. See 'Resolving Merged or Linked Patient Records' (see page 86).

6.14 Creating Patient Records

Most of the time, patient records are created through HL7 or through auto-create. But IntelliSpace PACS also allows users with the proper privileges to create and edit patient records manually. You create a patient by entering an MRN, demographic information, and contact information.

NOTE ***Refer to your local policy on creating new exam in IntelliSpace PACS before using the Create Patient feature. If you have HIS/RIS integration, patients created in IntelliSpace PACS will not be synchronized in your HIS/RIS.***

1. Use the **Patient Lookup** to search for and display a list of patient names.
2. Right-click over a list of patients, and from the menu choose **Create Patient**. The **Create Patient** dialog box displays with the **Demographics** pane displayed.
3. From the **Organization** list, select the organization to which the patient belongs. Only organizations to which you can add a patient record are listed.
4. Enter the **Medical Record Number** (MRN) for the patient (mandatory). This number must be unique within the organization, and cannot be more than 45 alphanumeric characters. The MRN you enter is displayed in the header of the **Create Patient** dialog box.
5. Enter the patient's first, middle, and last names. The first and last names are mandatory. The name you enter is displayed in the header of the **Create Patient** dialog box.
6. From the **Sex** list, choose the patient's gender. The sex you select is displayed in the header of the **Create Patient** dialog box.

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7. Enter the patient's date of birth. Either type in or click the up or down arrows to change the date. Use Ctrl-X or the Backspace key to clear the date field. The date of birth you enter is displayed in the header of the **Create Patient** dialog box.
8. Click **Contact Info.** The **Contact Info** pane displays.
   - Optionally, enter the patient's address and phone number(s).
9. Click **Save** to save the information and close the dialog box. If the MRN is already in use, a message displays when you click **Save**, prompting you to change the MRN and try again.

6.15 Editing Patient Records

You can use the **Edit Patient** dialog box to modify demographic or contact information for an existing patient, or to view or remove links from patient records. However, you cannot update the patient's organization.



WARNING ***After you edit patient-related demographics, the updates are not immediately propagated to other parts of IntelliSpace PACS.***

NOTE ***Refer to your local policy on creating new exam in IntelliSpace PACS before using the Edit Patient feature. If you have HIS/RIS integration, patients edited in IntelliSpace PACS will not be synchronized in your HIS/RIS.***

1. Use the **Patient Lookup** to search for and display a list of patient names.
2. Right-click on the patient you want to edit, and from the menu choose **Edit Patient**. The **Edit Patient** dialog box displays with the **Demographics** pane displayed.
3. Optionally, do the following:
   - Edit the patient's Medical Record Number (MRN). The MRN is displayed in the header of the **Edit Patient** dialog box.
   - Edit the patient's first, middle, and last names. The first and last names are mandatory. The name is displayed in the header of the **Edit Patient** dialog box.

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- From the **Sex** list, edit the patient's gender. The sex you enter is displayed in the header of the **Edit Patient** dialog box.
- Edit the patient's date of birth. Either type in or click the up or down arrows to change the date. Use **Ctrl-X** or the **Backspace** key to clear the date field. The date of birth displayed in the header of the **Edit Patient** dialog box.

4. Click **Contact Info**. The **Contact Info** pane displays.
5. Optionally, edit the patient's address and phone number(s).
6. Click **Linked Records**. The **Link Records** pane displays the patients who are linked to the patient you're editing.
   - Review the linked record.
   - To unlink the patient record, select the record and click **Remove Link**. A message displays asking to confirm the action. Click **Yes** to unlink or **No** to cancel.
7. Click **Save** to save the information and close the dialog box. If the MRN is already in use, a message displays when you click **Save**, prompting you to change the MRN and try again.

6.16 Deleting Patient Records

If you have the proper privileges, you can delete patient records. You must enter a reason for the deletion, which is included in the audit log. You can either select a pre-defined reason (created in the **Reason Dictionary**) or enter a free-text reason.

Note the following about deleted patient records:

- All studies associated with the deleted patient record become exceptions.
- The MRN (patient identifier) of a deleted patient can be reclaimed and assigned to another patient.
- When you delete a patient who has been linked to another patient, the link is removed and the linked patient's record is not changed or deleted.
- You cannot undo deleting a patient record.

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WARNING ***The Delete Patient option has been identified as a hazard area in IntelliSpace PACS that could result in no diagnosis or a delayed diagnosis. Philips strongly recommends that you take the following precautions when deleting patient records:***

- ***Regularly backup your system—only data that has been saved to a backup medium can be restored to your database; if you need to restore a patient record that was deleted in error to your database, you will need a backup medium from which to retrieve the erroneously deleted record.***
- ***Visually verify the patient record before deleting.***

1. Use the **Patient Lookup** to search for and display a list of patient names.
2. Right-click on the patient name you want to delete, and from the menu choose **Delete Patient**. The **Delete Patient** dialog box displays.
3. Do one of the following:
   - In the **Predefined Reason(s)** list, select the reason you want to delete the patient.
   - In the **Predefined Reason(s)** list, select the reason you want to delete the patient and enter additional text to elaborate on the reason.
   - Enter a free-text reason.
4. Click **Delete**.

6.17 Resolving Merged or Linked Patient Records

Patient merging is a critical feature of any healthcare information system. Unfortunately, it is not uncommon for a single patient to end up with duplicate records in a single system. As a result, the patient record becomes fragmented, meaning clinical decisions can be made with incomplete information, which can be a patient care issue.

There are two options for handling patient merges in IntelliSpace PACS:

- **Automatically:** IntelliSpace PACS provides the option to automatically merge patients upon receipt of an HL7 merge message (such as HL7 ADT:A40). IntelliSpace PACS does not require additional confirmation to merge patients when this option is used.

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- **Manually:** IntelliSpace PACS provides the option to populate the **Merge/ Link Candidates List** upon receipt of an HL7 merge message (such as HL7 ADT:A40). IntelliSpace PACS does require manual confirmation to merge patients when this option is used.

Multiple MRN/ACC Issuer without MPI

When a patient is created without a Master Patient Index (MPI), IntelliSpace PACS attempts to associate the new patient with existing patients in other Organizations. This is most commonly used at sites where multiple MRN issuers are present, but MPI is not implemented. IntelliSpace PACS uses the following matching criteria, also known as a **Weighted Match**, to associate a new patient with an existing one:

- 50 points are given for an exact match on PatientId (This is mainly there to handle auto-create organizations with the same issuer as a RIS organization).
- 25 points are given for the following attributes: mrnNumeric, patient last name, patient first name, middle name, patient birthdate, patient ssn.
- If the patient birthdate > 150 years, no points are given for the patient birthdate.
- If the ssn is empty or is equal to 000-00-0000, 111-11-1111,..., or 123-45-6789, no points are given for the ssn.
- If there are more than two matches in any organization, no matches are placed on the **Merge/Link Candidates** list for any organization. (This is to handle very common names like Smith or Gomez.)
- If the sex of the matching patient is different from the candidate patient, 50 points are subtracted.

A total of 100 points becomes a match candidate (merge candidate if in the same organization, or a link candidate if in a different organization). If there is a total of 125 points, the record is auto-linked, if the organizations Auto-Link setting is set to “True.”

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Multiple MRN/ACC Issuer with MPI

IntelliSpace PACS supports the use of a Master Patient Index (MPI) when it is consistently provided in the HL7 messages from all issuers. When MPI is implemented, IntelliSpace PACS does not perform any validation on patient demographic information; it relies on the authoritative sending systems to send correct demographics.

IntelliSpace PACS stores a patient's MPI as well as the specific MRNs associated with the appropriate Organizations. MPI to MPI merges are supported.

IntelliSpace PACS can read an MPI value from any field in an HL7 message—the field will be determined at the time of implementation, and may be a different field for each issuer as necessary.

6.18 Using the Merge/Link Candidates List to Merge or Link Patients

You can use the **Merge/Link Candidate(s)** list (found in the Folder List) to view and manage a list of potential duplicate records. Pairs of patient names are grouped together on the list, based on their records containing similar demographic information, including the patient address. The patient information is analyzed when the patient is created in the system, not when information for existing patients is updated.

The following information is displayed side-by-side for the two selected patients:

- Organization
- MRN
- First Name
- Middle Name
- Last Name
- Sex

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- Date of Birth
- Social Security Number
- Address
- Mother's Maiden Name
- Phone Number (work)
- Phone Number (home)
- Email address
- Alias Last Name
- Alias First Name
- Alias Middle Name
- Title
- Suffix
- Optional: Prefix

The **Merge/Link Candidate(s)** list is only visible if you have the proper privileges to resolve duplicate patient records. PACS Administrators can set the number of days after which Merge/link candidates are purged (from 1 to 999 days); the default is 90 days.

All merge operations will be audited and logged for:

- Completion of patient merge
- The user who performed the merge operation
- A time stamp showing when the merge was completed.
- An identifier (such as MRN) for the patient
- The MRN of the patient who was not kept.

NOTE ***When IntelliSpace PACS receives a patient merge event through HL7, it automatically merges the two patients.***

WARNING ***Review the configuration before linking or merging patients to make sure the correct patients are linked or merged.***

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1. From the **Folder List**, click **Merge/Link Candidate(s)**. Pairs of possible duplicate records display, sorted by patient name, using the first patient name of each set. All fields on the **Merge/Link Candidate(s)** list are searchable, allowing you to narrow down the list as desired. Note the following:
   - The **Patient Name** and **MRN** fields support wildcard searches. For example, to find patient Doe, John you can search for the full name (Doe, John), full last name and partial first name (Doe, J) or partial last name (D). There is also a wildcard search option that allows you to search on a partial last name and "%" and partial or full first name (for example "D%, Joh").
   - The **Organization**, **Type**, **Reason**, and **Sex** fields include a list of values you can select, but you can also enter the information manually. The information you enter manually will match a value in the list. Note that these fields do not support wildcard searches.
   - The **DOB** field includes a calendar control, but you can also enter the date manually. You can enter a date range (Start Date and End Date) to find all records with a patient Date of birth in that range. The date format matches the regional settings on your system (for example, in the U.S. the format is mm/dd/yyyy).
2. Right-click on a duplicate patient pair to display a menu with the actions you can take.
   - To merge duplicate patient records in the same organization, select **Merge Records**. The **Merge Patients** dialog box displays and allows you to complete the merge.
   - To link duplicate patient records in different organizations, select **Link Records**. The **Link Patients** dialog box displays and allows to complete the link.
   - To leave the original patient records unchanged, select **Ignore Patients**. A confirmation message displays. Click **Yes** to remove the selected merge pair from the **Merge/Link Candidate(s)** list and leave the original patient records unchanged.

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WARNING ***An incomplete merge may produce insufficient data or images that can result in delayed patient treatment or misdiagnosis. A warning message at the time of a patient merge error will display, indicating that the merge is incomplete and giving the demographics of the two patients being merged. The user is given the option to perform the merge again. The unsuccessful merge will be indicated as "Incomplete" in the audit trail.***

6.19 Merging Patient Records from the Same Organization

With the proper privileges, you can merge two patient records with different identifiers from the same organization into one surviving patient identifier. The surviving identifier is associated with all records originally belonging to the two patient identifiers.

There are two methods for generating merge candidates:

- Weighted Match (default option)
- Exact Match

In a Weighted Match configuration, a merge candidate pair will appear on the Candidates list based on a Point system (see 'Resolving Merged or Linked Patient Records' (see page 86).

In the Exact Match configuration, a merge candidate pair will appear based on very specific matching criteria. This is to support the 3.X legacy merge candidate functionality.

- If Auto-Link is enabled, all the fields – Last Name, First Name, Middle Name, Sex and Date of Birth – match exactly to confirm identity.
- If Auto-link is disabled, and Merge/Link Candidates is enabled, the candidate is considered a match and added to the list if
  - Last Name, First Name, and Date of Birth match exactly.
  - Middle Name matches exactly or is blank for any of the compared patients.
  - Sex matches exactly or is "Unknown" for any of the compared patients.

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If the patients match, they are put on the **Merge/Link Candidates** list. The System Administrator can then merge (if they are in the same organization), link (if they are in different organizations), or ignore the patient pair. See 'Resolving Merged or Linked Patient Records' (see page 86).

Note that you cannot update certain fields (such as nationality, race, religion, and so on) when merging. You can update these fields manually by editing the patient whose MRN is selected.



WARNING

- ***The Merge option has been identified as a hazard area in IntelliSpace PACS that could result in an incorrect or delayed diagnosis or delayed treatment.***
- ***Philips strongly recommends that you visually verify the patient records you want to merge before merging.***
- ***There is no undo function for the patient merge.***

6.20 Merging Linked Patients from Different Organizations

Two patients within a single organization can be merged in IntelliSpace PACS without having to first manually unlink them. The **Merge Patients** dialog box shows the currently selected merge patients' record as well as the organizations to which those patients are linked.

A patient link indicates that patient records in multiple organizations represent a single individual. These patient links may occur automatically as a result of an algorithm, be manually created, or as the result of there being an MPI. When a merge is performed, IntelliSpace PACS can be configured to automatically update the demographic information for any patient records linked across organizations.

The following conditions must be met for this merge linked patients across organization:

- There must be at least two organizations.
- One merge candidate must be linked to a patient in the second organization.

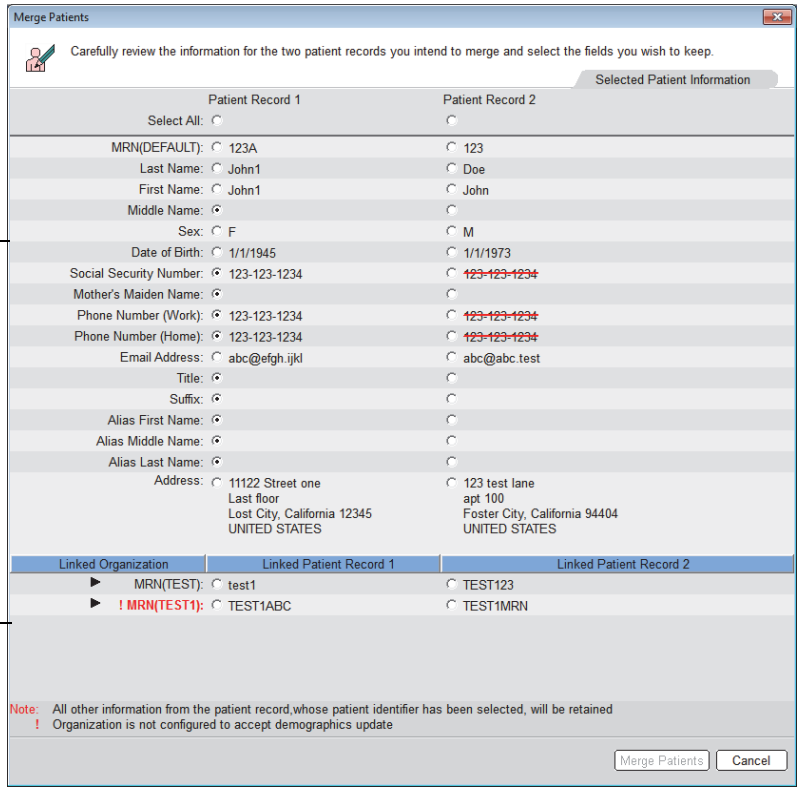
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If any linked organization has been configured to accept demographic updates for linked patients (in the IntelliSpace PACS AdminTool), a warning message is displayed before the **Merge Patients** dialog box opens. Additionally, a red exclamation mark (!) is displayed in the **Merge Patients** dialog box for these organizations and the MRN is displayed in red text, indicating that this demographic information will not be transferred after the merge.

1. Select the patients to merge and click **Merge Patients**.
2. Select the demographic details of the selected merge candidate from the current Organization.

Currently selected patient record to merge

Linked patient records


Merge Patients
Carefully review the information for the two patient records you intend to merge and select the fields you wish to keep.
Selected Patient Information
Patient Record 1
Patient Record 2
Select All:
MRN(DEFAULT): 123A 123
Last Name: John1 Doe
First Name: John1 John
Middle Name:
Sex: F M
Date of Birth: 1/1/1945 1/1/1973
Social Security Number: 123-123-1234 123-123-1234
Mother's Maiden Name:
Phone Number (Work): 123-123-1234 123-123-1234
Phone Number (Home): 123-123-1234 123-123-1234
Email Address: abc@efgh.ijkl abc@abc.test
Title:
Suffix:
Alias First Name:
Alias Middle Name:
Alias Last Name:
Address: 11122 Street one Last floor Lost City, California 12345 UNITED STATES
123 test lane apt 100 Foster City, California 94404 UNITED STATES
Linked Organization
Linked Patient Record 1
Linked Patient Record 2
MRN(TEST): test1 TEST123
! MRN(TEST1): TEST1ABC TEST1MRN
Note: All other information from the patient record,whose patient identifier has been selected, will be retained
! Organization is not configured to accept demographics update
Merge Patients
Cancel

The linked patient's MRN from the Organization is displayed in the bottom of the **Merge Patients** dialog box.

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3. If desired, select the MRN of the patient in the Linked Organization section to view the patient's demographic information (First Name, Middle Name, Last Name, Sex, Date of Birth, and Address).
4. Click **Merge Patients**. All linked patients with this demographic data are updated if IntelliSpace PACS has been configured to allow this.

6.20.1 Using the Merge/Link Candidate List to Merge Patients

NOTE ***Merge candidates appear within the same Organization, while Link candidates appear in different Organizations.***

1. In the Folder List, click **Merge/Link Candidate**.
2. Enter the search criteria for **Organization** and **Type** (**Merge** or **Link**). If you do not select an **Organization** or **Type**, all merge/link candidates for all organizations are retrieved.
3. Press **Enter** or click **Search**. A list of pairs of potential patients to merge or link displays. If no patients match, IntelliSpace PACS displays a message in the Control Strip.
4. Right-click on a set of patients' names and from the menu, select **Merge Patients** for merge candidates, or **Link Patients** for link candidates. (Review the **Type** column to determine whether you can merge or link.) See 'Linking Patient Records from Different Organizations' (see page 97).
5. The **Merge Patients** dialog box displays, displaying information from both patient records side-by-side. The information for the first patient you selected is displayed in the left column, and all fields are selected for this patient.
6. Select the fields you wish to keep for the new record. Fields you do not select are not kept in the merged record. The fields you can select are: **Last Name**, **Middle Name**, **First Name**, **Sex**, **Date of Birth**, **Social Security Number**, and **Address**. When you select a field, the corresponding field in the other record is displayed with a red line through it, indicating that you do not want to keep this information.

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7. Click **Merge Patients**. A confirmation message displays. Click **OK** to merge records and keep the selected patient data. The list of patient names is refreshed to display the updated merged patient information. The exams from both patients are displayed under the merged patient.

6.20.2 Using Patient Lookup to Find Patients to Merge

1. In the **Patient Lookup**, enter the desired search criteria to find the patients you want to merge.
2. **Ctrl-click** to select the two patients you want to merge.
3. When the names are selected, right-click and from the menu choose **Merge Patient**. The **Merge Patients** dialog box displays a list of the patient information fields, none of which are selected. In addition, the **Merge Patients** button is disabled (can't be selected or clicked). Note the following:
   - If any of the fields of the first patient record does not have a value, but the same field for the second patient has a value, then that value is selected automatically.
   - When a field does not have a value in either patient record, then the first patient's record is selected automatically.
   - When both fields are identical, the first patient record is selected automatically.
   - Each patient column has its own Select All button, which will select all of the fields of the given patient.
   - Selecting any radio button strikes out the value associated with the same field for the adjacent patient.
4. Review the information and select the button(s) next to the information you want to keep for the merged patient.
5. Click **Merge Patients**. A confirmation message displays.
6. Click **Yes** to complete the merge. The list of patient names is refreshed in the **Patient Lookup**.

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6.20.3 Merge Patient Examples

The following examples illustrate two reasons why you would need to merge patient records.

Example 1:

A single person has been entered into a HIS/RIS with two different Medical Record Numbers (MRNs), as follows:

- "John Smith, MRN: 123456, M, DOB: 12/31/00..." and
- "John Smith, MRN: 111111, M, DOB: 12/31/00...."

These records belong to the same individual, but because their MRNs are different, they are seen by the system as two unique individuals.

In theory, this scenario can pose a risk to patient care. In this example, the records for two John Smith's, both with identical demographic information, should be merged into one record. Be aware that there are significant implications to merging two patient records. If a pair is mistakenly merged, patient care could be delayed or impeded. Also, you cannot undo a patient merge.

Example 2:

An unconscious man is brought into the Emergency Room. He is given a fictitious name and MRN and other information when the technologist enters him into the HIS/RIS and takes images. Later, when the patient regains consciousness, the technologist is informed of his true name, date of birth, and so on, and enters this into the HIS/RIS.

Now, two patient records exist for the same patient. However, IntelliSpace PACS will not recognize these two records as merge candidates. In order to merge these patient records you must use the **Merge Patient** feature and perform a manual merge.

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6.21 Linking Patient Records from Different Organizations

Many healthcare systems provide MPI or other mechanisms for attempting to maintain a single patient record despite disparate patient management systems. Aside from providing a single patient history, value is also derived from maintaining a single unified set of patient demographics.

There are two variations for managing the demographics of linked patients (whether linked via MPI, PACS-driven linking, or manual linking):

- **Comprehensive Patient Record:** Intellispace PACS applies any demographic changes (whether received via HL7 or manually performed in the UI) to all linked patient records, thus maintaining the unified set.
- **Single Patient Record:** IntelliSpace PACS updates the demographics for a single patient record in a linked group of records (whether received via HL7 or manually performed in the UI). This allows a group of linked patient records to have varied demographics.

IntelliSpace PACS provides the option to enable or disable propagation of demographic updates to linked patients when changes to patient demographics (name, sex, DOB, etc.), exclusive of MRN are generated by one of the following:

- HL7 messaging
- the user interface (UI)

Linked patients are defined as patients who are linked because MPI is in use and the patients share an MPI; or the patients are auto-linked based on defined matching criteria; or the patients are manually linked using the UI (**Merge/Link Candidates** list).

A link is a useful way to see patient studies and reports in the same exam timeline, and to see all exams for a given person under a patient record in the patient lookup. You can link:

- Patient records in different organizations that represent the same patient.

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- Patients who already have existing links to other patients. In this case, the link connects all linked patients to the same patient record. There may be differences between the patients to be linked (for example, if there has been a name change), but much of the demographic information will usually match.

The following information is displayed side-by-side for the two selected patients:

- Organization
- MRN
- First Name
- Middle Name
- Last Name
- Sex
- Date of Birth
- Social Security Number
- Address
- Mother's Maiden Name
- Phone Number (work)
- Phone Number (home)
- Email address
- Alias Last Name
- Alias First Name
- Alias Middle Name
- Title
- Suffix
- Optional: Prefix

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If you have the proper privileges, you can remove patient records from links in the **Edit Patient** dialog box. See 'Editing Patient Records' (see page 84). Note the following about removing links:

- After you remove a link, the previously linked patients are not displayed on the **Merge/Link Candidate** list.
- If the MRN is modified, IntelliSpace PACS verifies that the MRN is unique in the organization.

1. Use the **Patient Lookup** to find the patients whose records you want to link. You can link two or more patients.
2. **Ctrl-click** to select the two patients you want to link.
3. When the names are selected, right-click and from the menu choose **Link Patients**. The **Linked Patients** dialog box displays a list of all patient records linked to the current patient record, including the organization, patient MRN, and patient name.
4. Verify that you are linking the correct patients. Review the **Organization**, **MRN**, **Last Name**, **First Name**, **Middle Name, Sex**, **Date of Birth**, **Social Security Number**, and **Address**.
5. Click **Link Patients**. The list of patient names is refreshed and a linked patient icon displays next to the name in the list of patients.

NOTE ***You can right-click on one or more linked patients and select Unlink Patient(s) to remove patients from a link.***

6.22 Creating Exams

Some hospitals schedule in "real time," meaning that orders are created when the patient arrives in Radiology. As a result, if the HL7 interface goes down, IntelliSpace PACS does not have the orders to match the studies against. You can use the **Create Exam** dialog box to manually create exams when the HL7 system is down. You can also edit exams. See 'Editing Exams' (see page 110).

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NOTE ***Refer to your local policy on creating new exams in IntelliSpace PACS before using the Create Exam feature. If you have HIS/RIS integration, exams created in IntelliSpace PACS will not be synchronized in your HIS/RIS.***

You might want to use the **Create Exam** feature when a patient brings in old prior films that do not have matching orders in your HIS/RIS. You can create an exam so that when those films are digitized and sent to IntelliSpace PACS, they can become part of the patient record.

1. Do one of the following:
   - Use the **Exam Lookup** to search for and display a list of exams.
   - Use the **Patient Lookup** to search for and display a list of patients. Display the exams for a patient.
   - Select a filter that displays exams.
2. Right-click over a patient or an exam in a list, and from the menu choose **Create Exam**. The **Create Exam**, dialog box displays with the **Exam Info** pane displayed.
3. Fill in the following fields as desired in the **Exam Info** pane.
   - Enter the **Organization**.
   - Enter the **Accession #**. (required), maximum length is 20 characters. Click **Generate** to generate the Accession #. The accession number is generated based on the Prefix/Current Value settings configured for the noted organization in the IntelliSpace PACS AdminTool. The maximum length is 20 characters.
   - From the **Exam Priority** list, select the priority of the exam.
   - From the **Exam Status** list, select the status of the exam.
   - Enter the **Scheduled Date/Time**. Click the arrow next to the date to select a date from a calendar control. Enter the time or click the arrows to set the time. You can review the **Performed Date/Time**, but cannot change it.
   - Enter the **Exam Code**, or click the button to search for and select an exam code from the **Exam Code Dictionary** (required).
   - Enter the **Modality**.

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- Enter a **Description** of the exam.
- Enter the **Body Part** for the exam.
- Enter the **Exam Code Modifier**, or click the button to search for and select one from the **Exam Code Modifier Dictionary**.
- Enter the **Performing Resource** for the exam, or click the button to search for and select one from the **Performing Resource Dictionary**.
- Enter the **Ordering Location** for the exam, or click the button to search for and select one from the **Ordering Location Dictionary**.

4. Click **Providers** to enter provider information. See 'Entering Provider Information When Creating Exams' (see page 101).
5. Click **Exam History** to enter exam history information. See 'Entering Exam History Information When Creating Exams' (see page 102).
6. Click **Save**.

6.22.1 Entering Provider Information When Creating Exams

1. Use the **Patient Lookup** to search for and display a list of patients.
2. Right-click over a patient or an exam in a list, and from the menu choose **Create Exam**. The **Create Exam**, dialog box displays with the **Exam Info** pane displayed.
3. Fill in the fields in the **Exam Info** pane and click **Providers** to display the next pane.
4. Enter the name of the **Referring Physician**, or click the button to search for and select a referring provider from the **Referring Physician Dictionary**. When you select a provider, the provider's ID, address, and phone information displays on the right side of the pane.
5. Click **Exam History** to enter exam history information. See 'Entering Exam History Information When Creating Exams' (see page 102).
6. Click **Save**.

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6.22.2 Entering Exam History Information When Creating Exams

1. Do one of the following:
   - Use the **Exam Lookup** to search for and display a list of exams.
   - Use the **Patient Lookup** to search for and display a list of patients. Display the exams for a patient.
   - Select a filter that displays exams.
2. Right-click over a patient or an exam in a list, and from the menu choose **Create Exam**. The **Create Exam**, dialog box displays with the **Exam Info** pane displayed.
3. Fill in the fields in the **Exam Info** and **Providers** panes and click **Exam History** to display the next pane.
4. Enter information on the **Signs and Symptoms** for the exam.
5. Enter information about the **History** for the exam.
6. Enter additional **Comments** about the exam.
7. Click **Save**.

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7 Finding and Managing Exam Information

7.1 Exam Lookup Overview

You can use the **Exam Lookup** to quickly find exams based on a combination of search criteria. You can also use the **Patient Lookup** to display a list of exams (by expanding the list of exams under a patient name), but the **Exam Lookup** is a more efficient way to find exams. See 'Patient Lookup Overview' (see page 63).

Note that the list of exams is not automatically updated when new exams come in.

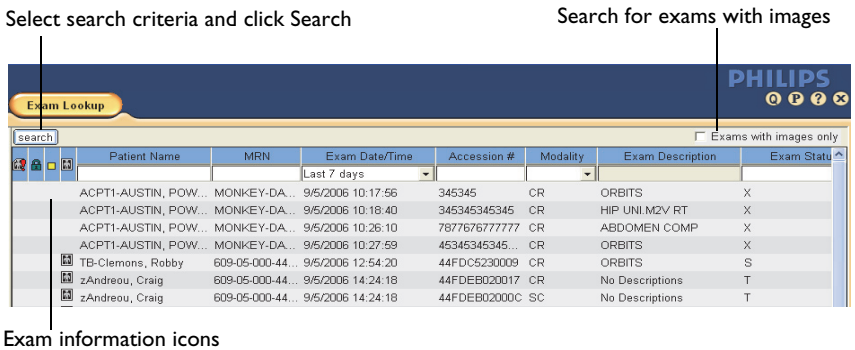

Select search criteria and click Search
Search for exams with images
Exam Lookup
PHILIPS
search
Exams with images only
Patient Name
MRN
Exam Date/Time
Accession #
Modality
Exam Description
Exam Statu
Last 7 days
ACPT1-AUSTIN, POW... MONKEY-DA... 9/5/2006 10:17:56 345345 CR ORBITS X
ACPT1-AUSTIN, POW... MONKEY-DA... 9/5/2006 10:18:40 345345345345 CR HIP UNI.M2V RT X
ACPT1-AUSTIN, POW... MONKEY-DA... 9/5/2006 10:26:10 7877676777777 CR ABDOMEN COMP X
ACPT1-AUSTIN, POW... MONKEY-DA... 9/5/2006 10:27:59 45345345345... CR ORBITS X
TB-Clemons, Robby 609-05-000-44... 9/5/2006 12:54:20 44FDC5230009 CR ORBITS S
zAndreou, Craig 609-05-000-44... 9/5/2006 14:24:18 44FDEB020017 CR No Descriptions T
zAndreou, Craig 609-05-000-44... 9/5/2006 14:24:18 44FDEB02000C SC No Descriptions T
Exam information icons

Figure 7.1 Exam Lookup

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Icons display to the left of exams indicate the following:

Icon	Description
	STAT exam
	Locked exam
	Linked exam
	Exam has been marked read
	Diagnostic report available
	Exam has exam notes
	Exam has images

You can search for exams using any combination of the following and other criteria. The search criteria in bold below must be displayed at all times:

- Stat
- Exam Loaded
- Exam Linked
- Mark Read
- Report Available
- Has Notes
- Has Images
- Organization
- Performing Resource
- Subspecialty
- Patient Name
- Patient Sex
- Date of Birth

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- **MRN**
- **Exam Date/Time**
- **Scheduled Date/Time**
- **Accession #**
- **Modality**
- Exam Description
- Exam Code
- Exam Status
- Body Part
- Referring Physician
- Referring Physician ID
- Laterality
- Ordering Location
- # Images
- Locked By
- Time Locked
- Priority
- Patient Class

When a list of exams is displayed, you can do the following:

- Double-click an exam to open it. (To open an exam without locking it, press and hold the **Alt** key while double-clicking on the exam.)
- Right-click to display a menu with actions.
- Rearrange and select certain search criteria columns to hide or display.
- **Shift-click** to select contiguous exams or **Ctrl-click** to select multiple, non-contiguous exams.
- Resize columns by clicking the right edge of the column and dragging it to the left or right.
- Sort the list by clicking on each column header.

7.2 Searching for Exams

1. Select **Exam Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).

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2. Enter the desired search criteria. If you search by Accession # or MRN, the **Exam Date/Time** field is ignored. Note that you can't use **Patient Sex** as a search criteria.)
3. If you only want to find exams that have images, select the **Exams with images only** check box.
4. Press **Enter** or click **Search**. A list of exams that match your search criteria is displayed. STAT exams are always displayed at the top of the list.

7.2.1 Searching for Exams by Patient Name

You can use patient names to search for exams by entering their last and first name or by using a wildcard search. For example, to find patient Doe, John you can search for the full name (Doe, John), full last name and partial first name (Doe, J) or partial last name (D). There is also a wildcard search option that allows you to search on a partial last name and "%" and partial or full first name (for example D%, Jo).

NOTE ***You can also search for exams by multiple referring physician names. Separate last names with semi-colons and first and last names with commas (for example, "Smith;Jones" or "Smith,Robert;Jones,David"). You can also include the wildcard character (%) to search for partial last or first names (for example, "Smi%" or "Smi%,Rob%").***

1. If it is not already displayed, select **Exam Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. Enter all or part of the patient's last or first name.
3. Click **Search** or press Enter. Exams for patients in the specified time or date range are displayed.

7.2.2 Searching for Exams by Date

You can select a supplied date/time value to search for exams, or specify a custom date range using a calendar control.

1. Select **Exam Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).

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2. In the **Exam Date/Time** column or Scheduled Date/Time column, select a time or date range from the list.
3. Click **Search** or press **Enter**. Patients with exams who match the date/time search criteria are displayed.

7.2.3 Searching for Exams by a Custom Date Range

NOTE ***The maximum date range you can specify in a Custom Date Range search is 100 years. If the search range is greater than 100 years (for example, 6/3/1911 - 6/3/2011), then an error message displays: "Custom search date range shall not exceed 100 years".***

1. Select **Exam Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. In the **Date/Time** column, select **Custom**. A **Start Date** and **End Date** window displays a range of Today's date for both start date and end date. If a **Custom** date is set to more than 7 days, the filter is not auto-refreshed every one minute.
3. Enter the desired start and end dates, or click the arrow for either date to enter the date using the calendar control. (Note that you cannot delete or modify the **Date/Time** field; you can only select a date from the calendar control.)
4. Click **OK** when you have entered the desired dates.
5. Click **Search**. Exams for patients in the specified date range are displayed.

7.3 Showing or Hiding Exam Lookup Columns

You can show or hide any exam search criteria columns except the ones that are grayed out in the list.

1. Right-click in the column area.
2. Select the columns you want to show or hide. Shown columns are checked; hidden columns are unchecked.
3. Repeat steps 1 and 2 as required.

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7.4 Rearranging Exam Lookup Columns

You can click and drag **Exam Lookup** columns to rearrange their order. This allows you to customize the order in which exam information is displayed.

- Press and drag a column to the position you want, and release the mouse button. Your changes are saved for your next session after you log out.

7.5 Sorting Results

After an exam lookup, the list is automatically sorted by exam date/time in ascending order.

- Click the blue column heading that you want to sort by. An arrow appears in the column heading to display whether the order is ascending (A-Z or 1-9) or descending order (Z-A or 9-1). To reverse the order, click the same column heading again.

7.6 Exam Management Overview

In IntelliSpace PACS, a single requested procedure is an exam. Each exam has a unique identifier – called an Accession # (maximum length of 20 characters) – in an organization. You can do the following for exams displayed from an **Exam Lookup** or in a filter. You access these features by right-clicking over a patient name in the **Exam Lookup** and selecting an option from the menu. A separate set of actions is available when you right-click on a patient instead of an exam. See 'Patient Management Overview' (see page 82) for more information.

- **View Exam Notes**: See 'Viewing Exam Notes' (see page 133)
- **Export via DICOM**: See 'iExport for DICOM Export' (see page 303)
- **Cache Exam**: See 'Local Exam Caching' (see page 123)
- **Create Exam**: See 'Creating Exams' (see page 99)
- **Edit Exam**: See 'Editing Exams' (see page 110)
- **Begin**: See 'Beginning Exams' (see page 115)
- **Complete Exam**: See 'Completing Exams' (see page 116)

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- **Cancel Exam**: See 'Canceling Exams' (see page 116)
- **Delete Exam**: See 'Deleting Exams' (see page 117)
- **Linking Exams**: See 'Linking Exams' (see page 119)
- **Unlinking Exams**: See 'Unlinking Exams' (see page 120)
- **Detach Study**: See 'Detaching Studies' (see page 121)

You must use the **Exception Handler** to resolve exceptions for exams if one of the following occurs. See 'Using the Exceptions Handler' (see page 180).

- An exam has been created automatically by auto-create (only occurs in auto-create organizations)
- An exam has been received from a 3rd-party archive (not by an auto-create port)
- The patient has provided images on a CD and you use a third-party tool (such as eFilm) to import the DICOM images

7.7 Understanding Exam Statuses

It is important to understand the different statuses an exam can have in IntelliSpace PACS to properly use the exam management features. The status of an exam changes as it transitions through IntelliSpace PACS and other systems. The following table lists the available exam statuses and indicates what the allowable exam statuses are within IntelliSpace PACS. Some exam statuses (displayed as blank in the table below) can only be changed by messages received through the HIS/RIS interface.

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Exam Status	Allowed From
S (Scheduled)	S
I (In Progress)	S
T (Taken)	
C (Completed)	S, I, T
D (Dictated and stored)	I, T, C
P (Preliminary)	
F (Final)	
A (Addended)	
R (Revised)	
X (Cancelled)	
N (Non-Reportable)	N, X

7.8 Editing Exams

You can use the **Edit Exam** dialog box to make corrections to exam information and to view a list of all exam records linked to the current exam record. See 'Viewing Linked Records When Editing Exams' (see page 115). For information on creating exams, see 'Creating Exams' (see page 99).

NOTE ***Refer to your local policy on creating new exams in IntelliSpace PACS before using the Edit Exam feature. If you have HIS/RIS integration, exams edited in IntelliSpace PACS will not be synchronized in your HIS/RIS.***

There are many reasons you might need to edit an exam, including:

- Adding a patient history or reason for exam in one of the **Comments** fields.
- Removing older studies received from a 3rd-party archive.
- Updating the **Exam Code** or **Provider** fields if they are blank or incorrect.

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- Assigning a new Accession # to an exam if a Technologist accidentally enters an Accession # from a different patient at the scanner. If the Accession # is already in use, the study can be detached.
- Receiving an order with a new exam code for which there is no associated body part. When the dictionary is updated so that the exam code has an associated body part, the Technologist can edit the exam to update the **Body Part** field.
- Adding data not provided by the HIS/RIS.

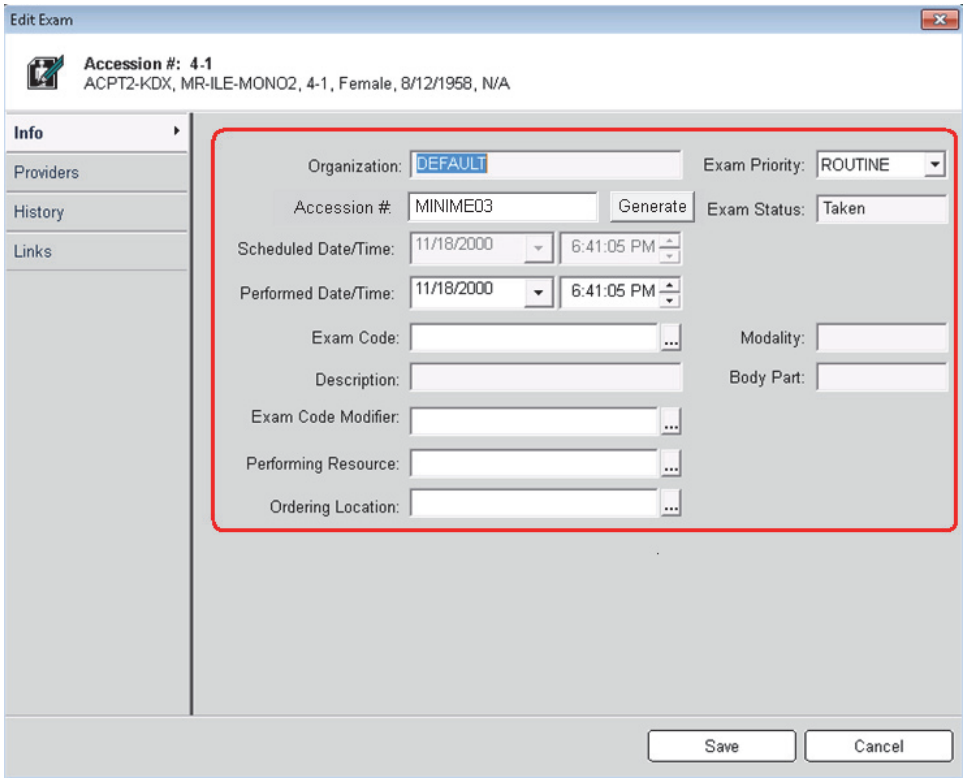
When you edit an exam, the **Edit Exam** dialog box header displays information about the patient whom the exam is for. The patient's identifier, last, middle, and first names, sex, date of birth, and Social Security number are displayed, in addition to the exam Accession #.

NOTE ***The following fields in the Edit Exam dialog are not editable: Scheduled Date/Time:, Description, Modality, and Body Part. The Description, Modality, and Body Part fields auto-populate when an Exam Code is selected.***

1. Do one of the following:
   - Use the **Exam Lookup** to search for and display a list of exams.
   - Use the **Patient Lookup** to search for and display a list of patients. Display the exams for a patient.
   - Select a filter that displays exams.

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2. Right-click an exam in a worklist, and from the menu choose **Edit Exam**. The **Edit Exam** dialog box displays with the **Info** pane displayed.



3. Modify the following fields as desired in the **Info** pane.

   - **Accession #**: Click **Generate** to generate the Accession #. The accession number is generated based on the Prefix/Current Value settings configured for the noted organization in the IntelliSpace PACS AdminTool. The maximum length is 20 characters.
   - **Exam Priority:** Select **Low**, **Medium**, **High**, **Routine**, or **STAT** for the exam priority. Note that if the filtering is greater than or equal to three days, exams with a priority of STAT are displayed at the top of the worklist.

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- **Performed Date/Time:** Click the arrow next to the date to select a date from a calendar control. Enter the time or click the arrows to set the time. You can review the **Scheduled Date/Time**, but cannot change it.
- **Exam Code:** Click the button to search for and select an exam code from the **Exam Code Dictionary** (required). Entering an Exam Code auto-populates the Description, Modality, and Body Part fields.
- **Exam Code Modifier:** Click the button to search for and select one from the **Exam Code Modifier Dictionary**.
- **Performing Resource:** Click the button to search for and select one from the **Performing Resource Dictionary**.
- **Ordering Location:** Click the button to search for and select one from the **Ordering Location Dictionary**.

4. If desired, click **Providers** in the left pane to edit provider information. See 'Changing Provider Information When Editing Exams' (see page 113).
5. If desired, click **History** in the left pane to edit exam history information. See 'Changing Exam History Information When Editing Exams' (see page 114).
6. If there are linked records associated with this exam, click **Links**.
7. Click **Save** when you are done.

NOTE ***You can type data directly in the Exam Code Modifier, Performing Resource, and Ordering Location fields, but if the data is incorrect or non-existent, the dictionary associated with that field will open and display the message "No Matching Records. Please refine your Query parameters." Either enter the correct parameters for the query and click Search, or click Cancel to close the Dictionary Query dialog, and then click the button next to the appropriate field to select from the corresponding dictionary.***

7.8.1 Changing Provider Information When Editing Exams

1. Do one of the following:
   - Use the **Exam Lookup** to search for and display a list of exams.
   - Use the **Patient Lookup** to search for and display a list of patients. Display the exams for a patient.

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- Select a filter that displays exams.

2. Right-click over an exam in a list, and from the menu choose **Edit Exam**. The **Edit Exam**, dialog box displays with the **Info** pane displayed. Fill in the fields in the **Info** pane and click **Providers** to display the next pane.
3. Enter the name of the **Referring Physician** or click the button to search for and select a referring provider from the **Referring Physician Dictionary**. If you enter a partial name, the **Providers Dictionary** dialog box displays with the matching physicians, so that you can select the correct one. If searching, do the following:
   - To search for all referring providers, click **Search**.
   - To filter the provider search, specify the search criteria and then click **Search**.
   - When the desired referring physician's name is displayed select it and click **OK**. The dictionary closes and the selected **Referring Provider** name displays in the **Edit Exam** dialog box.
4. If desired, click **History** to edit exam history information. See 'Changing Exam History Information When Editing Exams' (see page 114).
5. Click **Save**.

7.8.2 Changing Exam History Information When Editing Exams

1. Do one of the following:
   - Use the **Exam Lookup** to search for and display a list of exams.
   - Use the **Patient Lookup** to search for and display a list of patients. Display the exams for a patient.
   - Select a filter that displays exams.
2. Right-click over an exam in a list, and from the menu choose **Edit Exam.** The **Edit Exam** dialog box displays with the **Info** pane displayed. Fill in the fields in the **Info** and **Providers** panes and click **History** to display the next pane.
3. Add or edit the following information as desired:

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- Information on the **Signs and Symptoms** for the exam.
- Information about the **History** for the exam.
- Additional **Comments** about the exam.

4. Click **Save**.

7.8.3 Viewing Linked Records When Editing Exams

1. Do one of the following:
   - Use the **Exam Lookup** to search for and display a list of exams.
   - Use the **Patient Lookup** to search for and display a list of patients. Display the exams for a patient.
   - Select a filter that displays exams.
2. Right-click over an exam in a list, and from the menu choose **Edit Exam**. The **Edit Exam**, dialog box displays with the **Info** pane displayed.
3. Click **Links** and review the information. If desired, you can remove the link by clicking **Remove from Link**.
4. Click **Save**.

7.9 Beginning Exams

NOTE ***These actions—Beginning, Completing, Canceling, and Deleting exams—performed in IntelliSpace PACS do not update the HIS/RIS so they may cause IntelliSpace PACS to be out of sync with the HIS/RIS.***

When you begin an exam, the status changes from **Scheduled** to **In Progress** and that patient's demographic information is made available for download to the scanner. See 'Understanding Exam Statuses' (see page 109) for more information on exam statuses.

Before beginning an exam, you should first verify that the **Performing Resource** in the worklist is correct and that an interpreting provider has entered a protocol for the exam. Technologists who share worklists can

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differentiate between exams with a status of **Scheduled** and a status of **In Progress**. This allows Technologists to update Radiologists on an exam status before the images are sent to the PACS.

- Right-click on a scheduled exam in a worklist and select **Begin Exam** from the menu.

7.10 Completing Exams

NOTE ***These actions—Beginning, Completing, Canceling, and Deleting exams—performed in IntelliSpace PACS do not update the HIS/RIS so they may cause IntelliSpace PACS to be out of sync with the HIS/RIS.***

IntelliSpace PACS is usually configured so that the exam status is set to **Completed** when the exam is created using the auto-create port. See 'Understanding Exam Statuses' (see page 109) for more information on exam statuses.

After a Technologist performs a procedure, they often want to inform other IntelliSpace PACS users that the exam has been performed and is ready for review. They do this by setting the exam status to **Completed**. Many Radiologists create a worklist filter so that only **Completed** orders are displayed.

1. Right-click on an exam with a status of **In Progress** in a worklist.
2. From the menu, select **Complete Exam**.
3. The status of the exam changes from **In Progress** to **Complete** and the worklist is refreshed to show the updated exam status.

7.11 Canceling Exams

NOTE ***These actions—Beginning, Completing, Canceling, and Deleting exams—performed in IntelliSpace PACS do not update the HIS/RIS so they may cause IntelliSpace PACS to be out of sync with the HIS/RIS.***

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You can manually cancel exams that have a status of **Scheduled**. The Accession numbers of canceled exams are not re-released, and you cannot undo canceling an exam. Canceled exams are still visible in the worklist. Images received for canceled exams become an exception study.

See 'Understanding Exam Statuses' (see page 109) for more information on exam statuses.

1. Right-click on an exam with a status of **Scheduled** in a worklist.
2. From the menu, select **Cancel Exam**. The **Cancel Exam** dialog box displays.
3. Select the **Predefined Reason** you want to cancel the exam or enter a reason.
4. Click **OK**.

7.12 Deleting Exams

WARNING ***The incorrect use of the Delete Exam feature poses serious threats to patient diagnosis and patient care. Therefore, only qualified and thoroughly trained professionals should be given access to this feature. You should take the following precautions when deleting patient exams:***

- ***Regularly backup your system—only data that has been saved to a backup medium can be restored to your database; if you need to restore a patient record that was deleted in error, you will need a backup medium from which to retrieve the erroneously deleted record.***
- ***Visually verify the patient exam before deleting.***

NOTE ***These actions—Beginning, Completing, Canceling, and Deleting exams—performed in IntelliSpace PACS do not update the HIS/RIS so they may cause IntelliSpace PACS to be out of sync with the HIS/RIS.***

A deleted exam is an exam that was scheduled (and possibly performed), but whose folder was deleted. Deleting an exam removes all associated information, including exam notes. Deleted exams are not displayed in the Exam timeline. Accession numbers you delete are released and available for re-use for other patient exams. You cannot undo a delete.

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You should delete an exam only in the rare instance that the exam never should have been scheduled. For example, if two separate patients have the same name, and an exam is performed on the correct patient but recorded under the wrong name, you would need to delete the exam from IntelliSpace PACS and re-enter the information under the correct name. Other reasons you might want to delete an exam include:

- Test studies created at modalities need to be deleted.
- There are orders for procedures that IntelliSpace PACS does not receive images for, such as Radiology Non Image Chargeables, lab orders, and so on. Deleting these reduces clutter in the timeline and the rest of IntelliSpace PACS.
- The Technologist or someone else has made an error they want to undo, and do not want others to have access to the data.

Note that when deleting an exam with attached DICOM studies, the studies become exception studies.

While deleted exams are not visible in IntelliSpace PACS, they are not permanently deleted, meaning they are still in the database. IntelliSpace PACS audits the following information when an exam is deleted: IntelliSpace PACS user ID, deletion date, deletion time, accession#, MRN, and reason for deletion.

1. Right-click on an exam that does not have a status of **Scheduled** in a worklist.
2. From the menu, select **Delete Exam**. The **Delete Exam** dialog box displays. If you select a linked exam, a warning message displays indicating that the exam is linked, and that images originally received for this exam will no longer be available to the linked exams if the exam is deleted.
3. Select the **Predefined Reason** for deleting the exam or enter a reason.
4. Select the **Delete Studies** check box if you want to delete the images. If you do not select this option, the exam becomes an exception study.
5. Click **Delete**. The exam is deleted and the worklist is refreshed to show the updated patient information.

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7.13 Linking Exams

You can link multiple exams with the same MRN in the same organization to a single image set. The related images are available from any of the individual linked exams. Linked exams can be for different modality types but must belong to the same patient.

When you link multiple exams, all exams point to the same DICOM study. Linking only applies to images; it does not influence how reports are stored with exams. Canceling one exam does not automatically cancel the other linked exams. For example, you might have four exams scheduled in the RIS: CT HEAD, CT CHEST, CT ABDOMEN, and CT PELVIS, all with different Accession numbers. The orders are scanned in one sequence and end up in a single DICOM study. You can link these exams so they all point to the same study.

The actions you can take when linking exams for the same patient at the same organization depend on the status of the exams you are linking. Note the following when linking exams:

- You cannot link exams with a status of **Canceled** or **Deleted Studies**.
- You cannot delete linked exams. You must first remove the exam link.
- When exams are linked, if only one exam has images associated with it, the status of all the exams is the same status as the exam with images attached, as long as that exam has status of In Progress (I) or Taken (T).
- If no exams have images attached to them, the exam status stays the same after linking.
- When IntelliSpace PACS receives images for a linked exam and has either the In Progress (I) or Taken (T) status, the status of the other linked exams is set to the same status when they are still in Scheduled.
- A warning displays if you try to link two exams where one exam has been marked as read or has a status of **Dictated**, **Preliminary**, or **Final Report Status**. See 'Understanding Exam Statuses' (see page 109) for more information on exam statuses.
- You can unlink exams of any modality type.

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WARNING ***You cannot link exam notes to linked exams. For example, if you link CHEST-ABDOMEN-PELVIS exams and an exam note is attached to the CHEST exam, this exam note will not be displayed in the worklist and Canvas Page associated with the ABDOMEN and PELVIS exams. Also, the exam note might contain information on the linked exams that will not be visible to the reading physician or clinician.***

1. From the list of exams, **Shift-click** or **Ctrl-click** to select the exams you want to link. You can link two or more exams.
2. Right-click and select **Link Exams** from the menu. The exams are linked and the **Link** icon is displayed.

7.14 Unlinking Exams

The effect of unlinking exams depends on whether or not images have arrived for the exam, as follows:

- When you unlink an exam before images have arrived, you undo the **Link Exam** function.
- When you unlink an exam from a group of exams after images have arrived, the selected exam is removed from the link, meaning that there are no longer images attached to the exam.

You can unlink one or multiple linked exams. Unlinking an exam does not change the exam status. You should not unlink exams after they are marked as read or if they have a report attached to them.

1. From the list of exams, right-click on the linked exam(s) you want to unlink.
2. Select **Unlink Exams** from the menu. The selected exams are unlinked and the **Link** icon is removed.

7.15 Viewing Locked Exams

When a Radiologist opens an exam to read, the exam becomes locked so that no other user can mark the exam as read. However, sometimes the Radiologist who has the exam open leaves the workstation without closing

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the exam, or their workstation crashes while the exam is locked. If this occurs, the System Administrator can unlock the exam so that another Radiologist (or the same Radiologist) can re-open the exam to read.

IntelliSpace PACS includes a worklist called **Locked Exams** which shows which exams are opened and locked, and by whom. Users with the proper privileges can unlock an exam from this worklist.

WARNING ***Locks are granted on a per-user basis. This means that if multiple users log into IntelliSpace PACS using the same user ID, these users will be able to unlock and mark exams read locked by each other. To prevent this from occurring, make sure you confirm the patient identity and demographic information before beginning an exam.***

1. From the **Folder List**, click **Locked Exams**. A list of the currently locked exams displays.
2. Enter the desired search criteria. Note that you can use the **Delete** key to clear the date field.
3. If you only want to find locked exams that have images, select the **Exams with images only** check box.
4. Press **Enter** or click **Refresh**. A list of exams that match your search criteria is displayed.

7.16 Unlocking Exams

NOTE ***Only users with the proper permissions can unlock an exam.***

1. From the list of locked exams, right-click on the exam you want to unlock.
2. Select **Unlock Exam** from the menu. A confirmation message displays.
3. Click **OK**. The exam is unlocked and removed from the list of locked exams.

7.16.1 Detaching Studies

Sometimes it is necessary to detach a study from a patient's exam record. For example, if images belonging to one patient's exam are accidentally assigned to another patient's exam, you must detach those images from that exam and reassign them to the correct patient's exam.

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When you detach a study, you create an exception that you must resolve in the **Exceptions Handler**. When you attach a study, you resolve the exception and reassign the exam to the correct patient. You can also detach an individual study from an exam in the Canvas Page. See 'Detaching Individual Studies from Exams' (see page 211). Note that you cannot detach linked exams.

NOTE ***When a study is detached from an exam, IntelliSpace PACS may not be able to determine whether that study was used to set the exam fields. Therefore, when an exam gets created with no modality type and body part, the following might occur:***

- ***Study1 arrives and is wrongly attached to the exam. The modality and body part of study1 is copied into the exam.***
- ***When study2 arrives for the exam (correctly), its modality and body part are ignored (because the exam already has them set).***
- ***When you detach study1 from the exam, IntelliSpace PACS shows the wrong modality and body part for the exam.***

To correct this problem, manually edit the exam and select an exam code that is associated with the correct modality and body part.

1. In the **Patient Lookup**, **Exam Lookup**, or a worklist that shows exams, find the exam from which you want to detach a study.
2. Right-click on the exam and from the menu, select **Detach Study**. A confirmation message displays.
3. Click **OK**. The study is detached and becomes an exception. You now need to resolve the exception and reassign the exam to the correct patient.
4. In the **Exception Lookup** or a worklist that shows exceptions, find the exam you detached.
5. Right-click on the exam and from the menu, select **Resolve Exception**. The **Exceptions Handler** displays.
6. Use the **Exceptions Handler** to resolve the exception. See 'Using the Exceptions Handler' (see page 180).

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7.17 Local Exam Caching

The **Local Exam Cache** feature allows you to download patient exams to your local machines. This helps speed up access to patient exams when IntelliSpace PACS is being used remotely. The exam is downloaded to the location specified in the Local Exam Caching pane of the **Preferences** dialog box. See 'Setting Local Exam Caching Preferences' (see page 396).

Cached exams are displayed in the **Local Exam Cache** folder. In addition, the individual listings display progress information as the exam is cached. The exam listings in the **Local Exam Cache** provide information about the patient and exam that has been cached. The columns include, from left to right:

- Close All (exam level listings)
- Status ()
- Subject (Patient name, Modality, Body Part)
- Received Date and Time
- Sender

You can sort the list by clicking these columns. The Status icon in the exam listing indicates whether the exam was successfully cached.

Certain patients, such as politicians, entertainers, and hospital employees, may be designated as VIPs (Very Important Persons) in IntelliSpace PACS. Accessing these patient records and performing all actions (such as opening exams, viewing images, exporting exams from the Media Viewer, and so on) are audited.

If you move several exams to the Local Exam Cache folder and some of the exams are for sensitive patients, the names and MRNs of the sensitive patients are listed before the exams are copied to the Local Exam Cache folder. You can choose to either copy all these exams or cancel the operation.

IntelliSpace PACS System Administrators should note the following:

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- If there is not enough room for a given exam to be downloaded, the oldest downloaded exam is deleted. If there is still not enough disk space available to download the exam, the caching operation is suspended and the user is informed that there is insufficient disk space available.
- For security reasons, all images and metadata are cached in encrypted format.
- All images are stored on the local hard disk in the user's environment to avoid access privilege problems in Username\Local Settings\Application Data\iSite\4.4\Local Cache. Only users who logged into the workstation with the Local Exam Cache privilege can cache and view the cached exams, because it is saved under their username. If another user logs into the workstation after the previous user had cached exams to the hard disk, they will not have access to those previously cached exams.
- If new images have arrived at the IntelliSpace PACS Server after they were cached at a client, IntelliSpace PACS automatically loads these additional images into the viewer when the user requests them using the standard "just-in-time" iSyntax download mechanism. These additional images are not cached on the local hard disk.

The following actions are available when you right-click on an exam listing in the **Local Exam Cache** folder:

- **Show Report**: Displays the report associated with this exam. See 'Displaying and Printing the Current Report' (see page 145).
- **Show Exam Memos**: Displays the exam notes associated with this exam. See 'Using Exam Notes' (see page 128).
- **Export via DICOM**: Allows you to export the exam via DICOM. See 'iExport for DICOM Export' (see page 303).
- **Start Caching**: Allows you to start the caching of the selected exam(s) immediately.
- **Cancel Caching**: Allows you to cancel the caching if the process has already started.
- **Delete Cache Item**: Allows you to delete the selected cached exam(s).

1. Select the desired exam from a list of exams.

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2. Drag the exam to the **Local Exam Cache** folder.
3. Click **Local Exam Cache** in the Folder List to ensure that caching of the exam is complete. (100% displays in the **Status** column of the cached exam.)

7.17.1 Opening a Cached Exam

You cannot open an exam until it has been downloaded completely

1. To open a cached exam, click the **Local Exam Cache** folder in the Folder List.
2. Double-click the exam.

7.17.2 Viewing Preferences of Local Exam Caching

1. Click **P** in the Control Strip to open the Preferences dialog.
2. Click the **+** sign in front of **Machine Preferences** to expand the list.
3. Click **Local Exam Caching**. The Local Exam Caching preferences are displayed in the right pane.
4. When you are done viewing the preferences, click **OK** to close the Preferences dialog.

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8 Viewing Clinical Information

Physicians base their treatment plan and diagnosis not only on their own findings but also on the diagnosis and recommendations of other specialists. This is especially true for Radiology, where typically every radiology exam that is ordered by a Referring Physician is reported on by a Radiologist and the results (called the Diagnostic Report) are provided back to the Referring Physician.

The Clinical Information dialog allows users to draw relevant clinical information when rendering diagnoses or determining treatment plans. It provides clinical decision support by displaying patient demographics, exam notes, diagnostic reports, exam history, and provider information. Therefore, the more clinical information it provides, the more clinical users are informed of the patients' imaging history and previous diagnoses.



WARNING

- ***Make sure that patient demographics are properly completed, so that all patient data is available for the Radiologist and Referring Physician, and diagnosis is not delayed.***
- ***Avoid editing patient data at the modality without starting a new exam. This could potentially mix patient studies and therefore cause a Duplicate UID,***

IntelliSpace PACS receives clinical data from DICOM via imaging studies and from HL7 via diagnostic reports and patient/exam registration events.

A HIS or RIS integrated with IntelliSpace PACS provides a rich history of the patient's imaging record. This information is invaluable for Administrators when resolving exceptions or studies not validated with any patient exam. The task of validating an exception with a patient's exam by a PACS Administrator includes accessing the patient's imaging record and deciding which exam the exception should be validated against. Therefore, to simplify administrative workflow with resolving exceptions, the Exception Handler allows direct access to the Clinical Information Dialog to view a patient's entire exam list.

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You can use the Clinical Information dialog box to display the following types of exam information in a single window.

- 'Using Exam Notes' (see page 128)
- 'Viewing Clinical Info' (see page 135)
- 'Viewing Related Exams' (see page 137)
- 'Viewing All Exams' (see page 139)
- 'Viewing Current Providers' (see page 140)
- 'Displaying and Printing the Audit Trail' (see page 142)
- 'Displaying and Printing the Current Report' (see page 145)

NOTE ***You can add a comment for an anonymous exam (similar to an exam note). See 'Adding Comments to an Anonymous Exam' (see page 58).***

8.1 Using Exam Notes

Exam notes allow IntelliSpace PACS users to communicate setup, non-diagnostic, or diagnostic information about a patient. They can range from generic comments about an exam, to preliminary findings ("wet reads") that other clinicians can use in their decision making.



WARNING ***Exam Notes and Diagnostic Reports are not the same entity. Medical treatment plans should never be based on Exam Notes alone, as Exam Notes often have preliminary information. Diagnostic Reports can be used to help physicians design a medical treatment plan.***

NOTE ***Only users with access rights associated with specific exam note types can view or create exam notes of that type.***

IntelliSpace PACS includes exam notes to address the following situations:

- Radiologists may not be in the same locations as clinicians, making communication difficult.
- Some patients (for example, an ED patient with possible acute appendicitis) may require time-critical clinical management ("wet read").

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- Sometimes, clinicians look at images before the Radiologist does. Patient care is improved if the Radiologist knows that the physician has looked at the images and made conclusions. This allows the Radiologist to contact the physician immediately if they disagree with the clinician's impressions or conclusions.
- Radiologists and clinicians want to respond to each other's findings.
- Technologists may need to add notes to the exam that are relevant for the exam (for example, “The patient could not hold his breath.”).

There are three types of pre-defined Exam Notes (Preliminary Note, Technologist Note, and Radiologist Note), and up to nine types of generic Exam Notes. The PACS administrator can modify the description of the generic note types.

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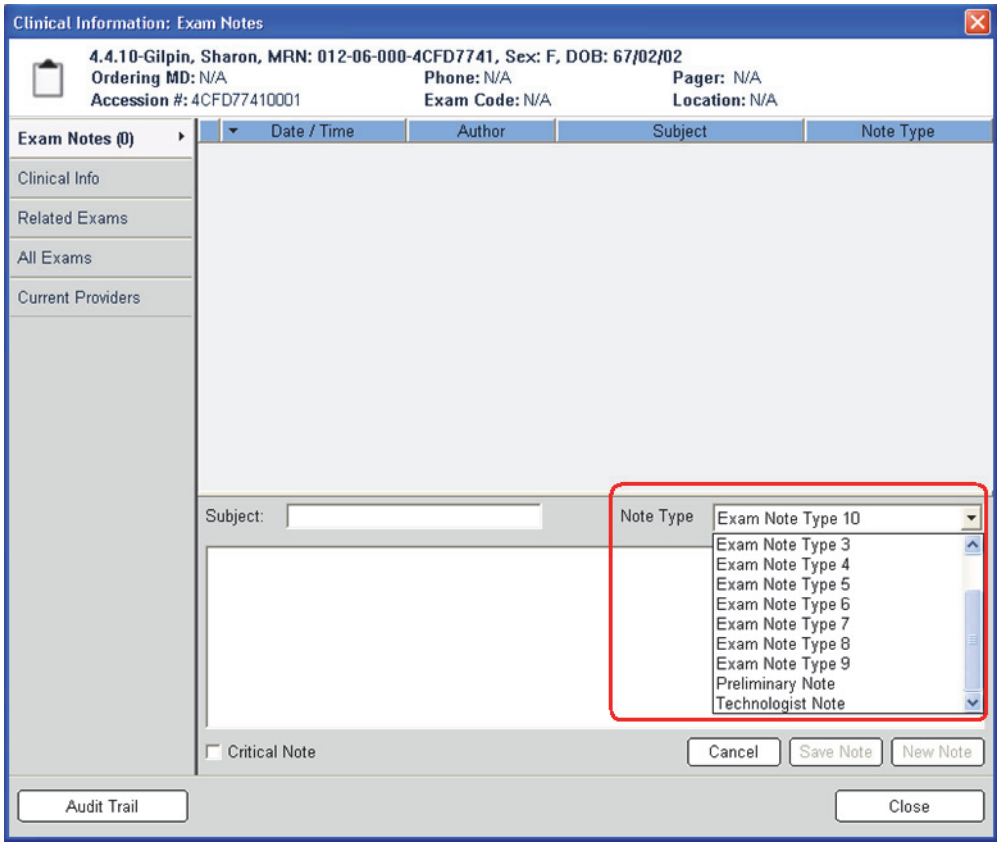


Figure 8.1 Exam Notes pane in the Clinical Information dialog

Each Exam Note type has three tasks/roles, based on access privileges:

- Full access to the Exam Note type
- Read-only access to the Exam Note type
- Ability to Read, Delete, and Create your own Exam Notes, but with read-only access to Exam Notes created by others

If you have the proper privileges, you can

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- Add, view, and delete exam notes in the **Exam Notes** pane of the **Clinical Information** dialog box, which is accessed by doing one of the following:
  - In the Canvas Page, clicking the clipboard icon in the Exam Margin
  - Right-clicking on an exam in **Patient Lookup** or **Exam Lookup** and selecting **View Exam Notes**.
- Mark an exam note as critical to alert providers of its importance. When critical exam notes are available for an exam, an icon displays in the Clinical Information dialog as well as on the clipboard icon in the Exam Margin. However, in the Worklist, the icon does not display to indicate the presence of a Critical Note.

You cannot edit an exam note that you have saved. To correct a note, you need to delete the note and create a new one.

You can set a User preference to automatically display exam notes for unread exams. See 'Setting General Preferences' (see page 338).

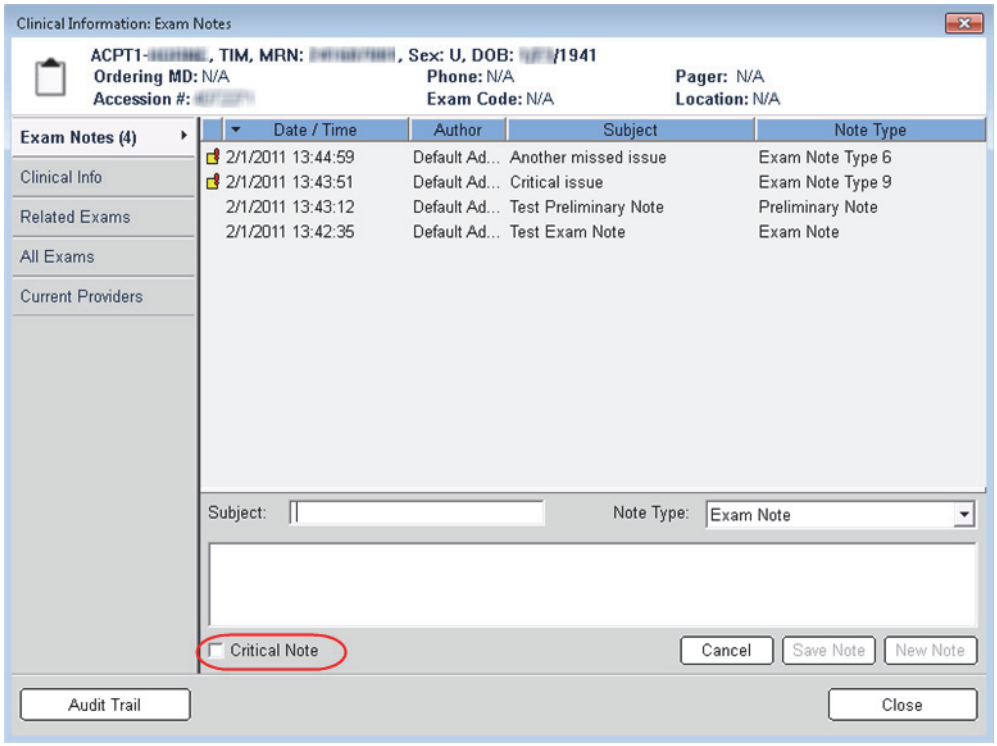
WARNING

You cannot link exam notes to linked exams. For example, if you link CHEST-ABDOMEN-PELVIS exams and an exam note is attached to the CHEST exam, this exam note will not be displayed in the worklist and Canvas Page associated with the ABDOMEN and PELVIS exams. Also, the exam note might contain information on the linked exams that will not be visible to the reading physician or clinician.

- Display the **Exam Notes** pane of the **Clinical Information** dialog box in one of the following ways:
  - From the Canvas Page, click the icon in the Exam Margin.

    
  - Right-click an event in the Patient History Timeline on the Canvas Page and select **View Exam Notes**.
  - Right-click an exam in **Patient Lookup** or **Exam Lookup** and select **View Exam Notes**.

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8.1.1 Creating Exam Notes

You can create up to 25 exam notes (up to 5,000 characters) for each exam. You can also mark exam notes as critical by selecting the Critical Note check box.

WARNING ***If immediate medical treatment is needed, or if you disagree with a prior exam note, contact the treating physician immediately. You should not rely on creating a critical exam note in these situations.***

1. Display the **Exam Notes** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the clipboard icon in the Exam Margin.

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- Right-click on an event in the Patient History Timeline on the Canvas Page and select **View Exam Notes**.
- Right-click on an exam in **Patient Lookup** or **Exam Lookup** and select **View Exam Notes**.

2. Click **New Note**. The Exam Notes types that you have access rights to display.
3. The **Subject**, **Note Type**, and note area become active.
4. Enter the subject of the note. This appears in the summary when the exam note is listed in the **Clinical Information** dialog box.
5. Select a note type from the list. Three types of pre-defined exam notes and up to seven generic types (modified by the PACS Administrator) are supplied.
   - **Exam Note** for general information
   - **Preliminary Note** for preliminary findings
   - **Technologist Note** for communicating information about the exam for the referring physician or Radiologist
6. If desired, select the **Critical Note** check box to alert providers of its importance. Critical exam notes are marked with an icon.
7. Type the exam note. (You can also paste clipboard text from another application into the exam note using **Ctrl-V**.)
8. Click **Save Note**. The exam note is saved and summary information about the exam note is displayed.

NOTE ***When a user creates an Exam Note, the system audits the event and displays the event in the Exam Audit Trail. When user accounts are mapped using Active Directory (AD), the audit event will indicate the AD username.***

8.1.2 Viewing Exam Notes

You select exam notes in the **Clinical Information** dialog box to view their content. The most recent exam notes are listed first. Summary information about the exam note is displayed, including an icon indicating whether the

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note is critical, the date and time the note was written, the author of the exam note, the subject, and the note type. You can sort the notes by clicking on a column heading.

In both IntelliSpace PACS Enterprise and IntelliSpace PACS Radiology, when the **Automatically Display Exam Notes for unread exams** user preference is enabled (see 'Setting General Preferences' (see page 338)), the first exam opened is the main exam and the Exam Notes for that exam (if any) automatically open. Opening subsequent exams from the Patient History timeline – or Relevant Exams (ISR only) – does not display the Exam Notes for the subsequent exam(s). You must manually click the Exam Notes icon for that exam to open those exam notes.

In IntelliSpace PACS Enterprise, if you open a second exam for the same patient from Patient Lookup, the exam notes for the main exam continue to display. You then must click the Exam Notes icon for the second exam in order to view those exam notes.

NOTE ***You can always click the Exam Notes icon for an exam displayed on the Canvas Page to view any associated exam notes for that exam.***

1. Display the **Exam Notes** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Margin.
   - Right-click on an event in the Patient History Timeline on the Canvas Page and select **View Exam Notes**.
   - Right-click on an exam in the **Patient Lookup** or **Exam Lookup** and select **View Exam Notes**.
2. Select the exam note you wish to view. The note is displayed at the bottom of the dialog box.

8.1.3 Printing Exam Notes

IntelliSpace PACS supports the printing of all types of exam notes from the Clinical Information dialog. To print an exam note, right-click an exam note and select **Print** from the right-click menu.

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NOTE ***When a user prints an Exam Note, the system audits the event and displays the event in the Exam Audit Trail. When user accounts are mapped using Active Directory (AD), the audit event will indicate the AD username.***

8.1.4 Deleting Exam Notes

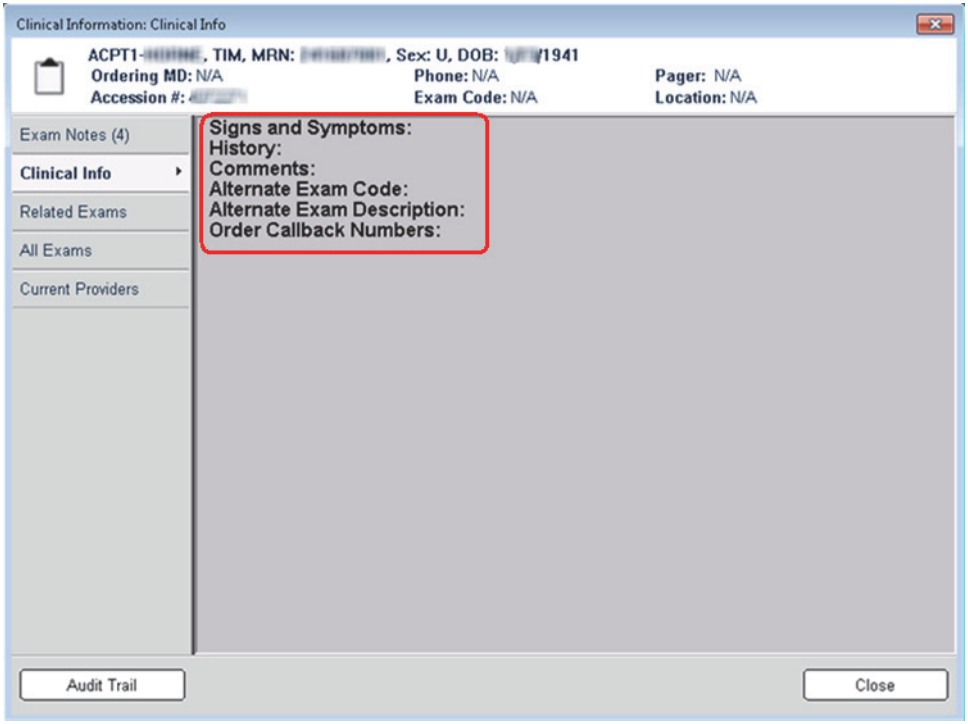
1. Display the **Exam Notes** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Margin.
   - Right-click on an event in the Patient History Timeline on the Canvas Page and select **View Exam Notes**.
   - Right-click on an exam in the **Patient Lookup** or **Exam Lookup** and select **View Exam Notes**.
2. Select the exam note you wish to delete.
3. Click **Delete Note**. A confirmation message displays.
4. Click **Yes** to delete the exam note or **No** to cancel.

NOTE ***When a user deletes an Exam Note, the system audits the event and displays the event in the Exam Audit Trail. When user accounts are mapped using Active Directory (AD), the audit event will indicate the AD username.***

8.2 Viewing Clinical Info

The **Clinical Info** pane of the **Clinical Information** dialog box allows you to view signs and symptoms, patient history, and allergies, that are relevant to the exam and give background information on the patient. If available, an Order Callback Number (a phone number for the Radiologist to call the ordering or referring physician) and Alternate Exam Code field (a second Exam Code field that in some organizations is specified as a Universal Service ID) are displayed.

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The information in this pane helps physicians understand why a patient has been referred to Radiology. For example, the Radiologist will look for different abnormalities in a cancer case, compared to a trauma case.

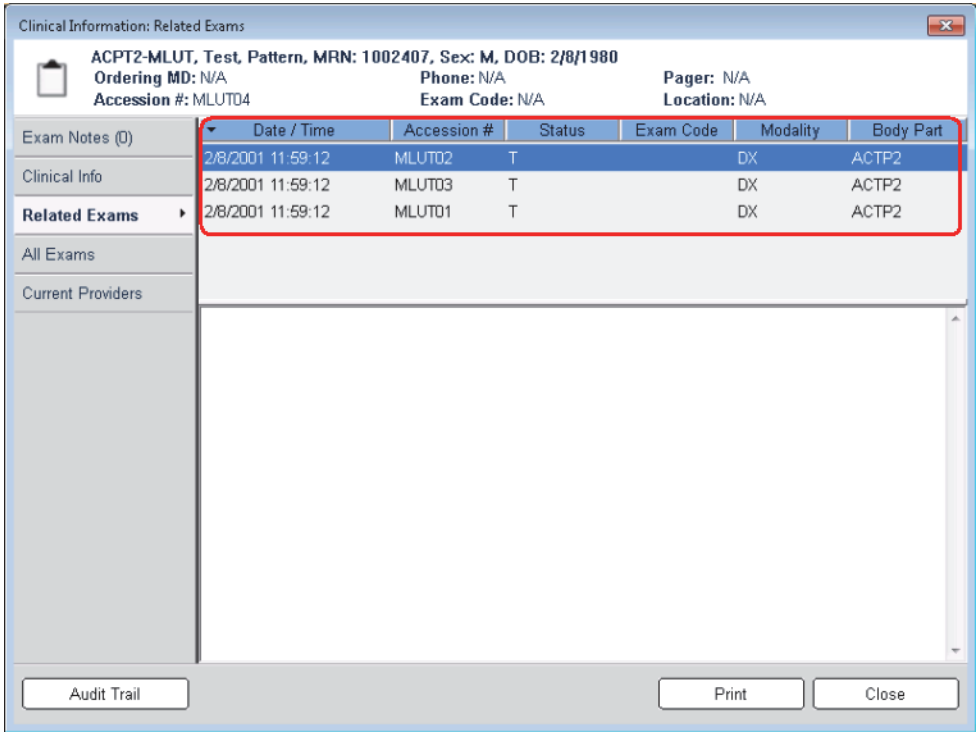
1. Display the **Clinical Info** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Rack.
   - From the **Patient Lookup**, **Exam Lookup** or a worklist that displays exams and has the **Has Notes** column visible, right-click the exam and select **View Exam Notes**.
2. Click **Clinical Info** in the **Clinical Information** dialog box. The **Signs and Symptoms**, **History**, and **Comments** display for the exam.

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3. Review the information.
4. Select another pane from the **Clinical Information** dialog box if desired, or click **Close**.

8.3 Viewing Related Exams

Related exams are filtered based on body part. You can use the **Related Exams** pane of the **Clinical Information** dialog box to see a list of related exams for the current exam and patient in the context of a report. For example, if you are doing a tumor response assessment, you would want to compare images between two or more exams to determine the progress of a disease or treatment.



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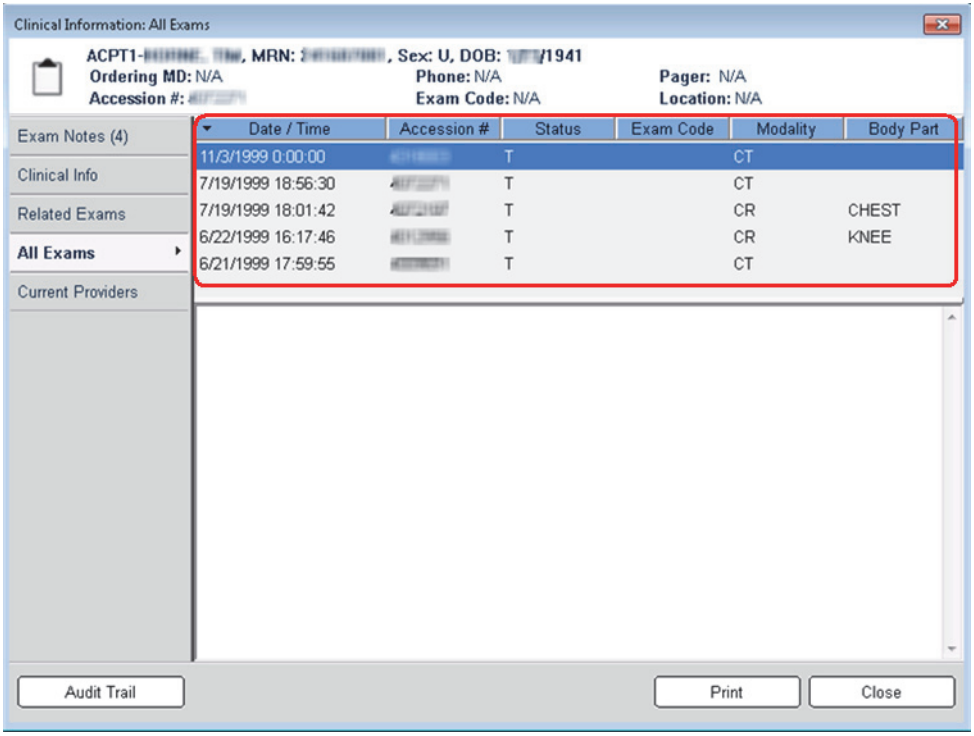
Patients sometimes have multiple exams in a 24-hour period while their state is being monitored. Therefore, it is critical to be able to quickly select, navigate, and compare relevant reports.

1. Display the **Related Exams** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Rack.
   - From the **Patient Lookup**, **Exam Lookup** or a worklist that displays exams and has the **Has Notes** column visible, right-click the exam and select **View Exam Notes**.
2. Click **Related Exams** in the **Clinical Information** dialog box, and review the information. You can click on a related exam to display its report, if that exam has a report.
3. Select another pane from the **Clinical Information** dialog box if desired, or click **Close**.

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8.4 Viewing All Exams

You can use the **All Exams** pane of the **Clinical Information** dialog box to select and view all exam information for the patient. This allows you to compare the results of patient exams. For each exam, IntelliSpace PACS displays the Date/Time, Accession #, Status, Exam Code, Modality, and Body Part.



1. Display the **All Exams** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Rack.
   - From the **Patient Lookup**, **Exam Lookup** or a worklist that displays exams and has the **Has Notes** column visible, right-click on the exam and select **View Exam Notes**.
2. Click **All Exams** and review the information.

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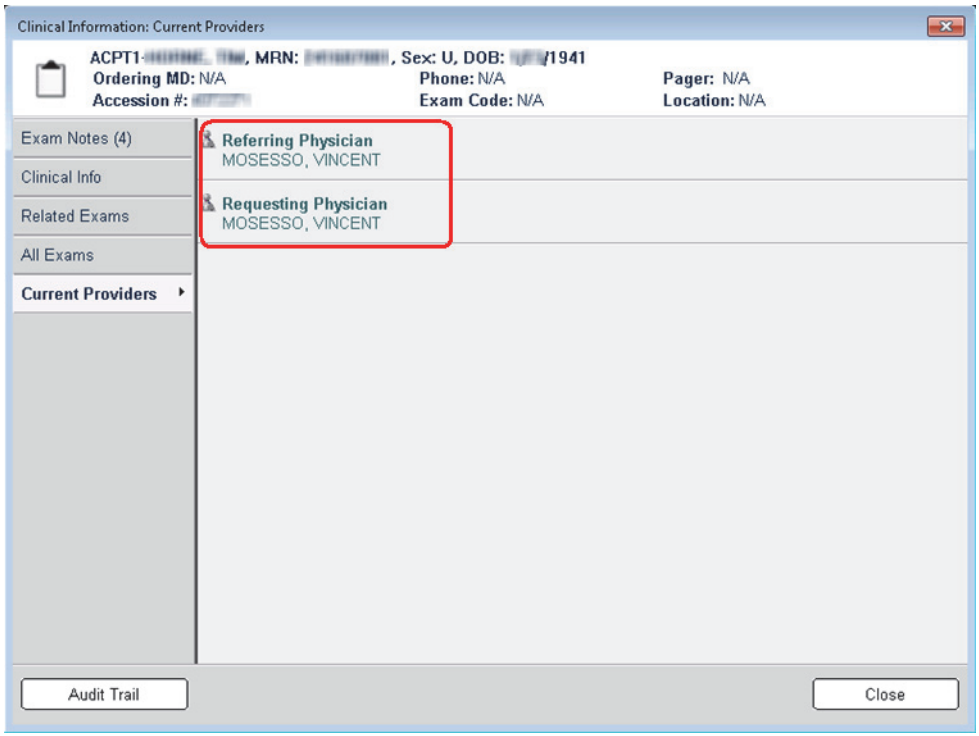
- To sort, click on a column heading.
- You can click an exam to display its report, if that exam has a report.
- If the selected exam has no report available, a message displayed below the list of exams.

3. Select another pane from the **Clinical Information** dialog box if desired, or click **Close**.

8.5 Viewing Current Providers

You use the **Current Providers** pane of the **Clinical Information** dialog box to view information on all the providers associated with the report and patient, including contact information. Often, referring providers have questions or comments about a report. Having easy access to the associated providers with each report gives referring providers the information they need to contact the Radiologist and discuss the report.

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For each provider, IntelliSpace PACS displays the following information (if available):

- Type of provider (for example, Admitting, Attending, Consulting)
- Name of provider
- Phone numbers
- Address
- Attending Physician

1. Display the **Current Providers** pane of the **Clinical Information** dialog box in one of the following ways:

   - From the Canvas Page, click the icon in the Exam Rack.

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- From the **Patient Lookup**, **Exam Lookup** or a worklist that displays exams and has the **Has Notes** column visible, right-click the exam and select **View Exam Notes**.

2. Click **Current Providers** and review the information.
3. Select another pane from the **Clinical Information** dialog box if desired, or click **Close**.

8.6 Displaying and Printing the Audit Trail

PACS Administrators who are performing HIPAA compliance auditing or troubleshooting are usually accessing exams and viewing images within IntelliSpace PACS Enterprise or IntelliSpace PACS Radiology. The admin's workflow is simplified by having the Audit Trail accessible from within the Clinical Information dialog of the following significant HL7, DICOM, and user-initiated events associated with an exam's Accession Number:

The following actions are audited and visible in the IntelliSpace PACS AdminTool; some actions are visible in the **Audit Trail** dialog in IntelliSpace PACS.

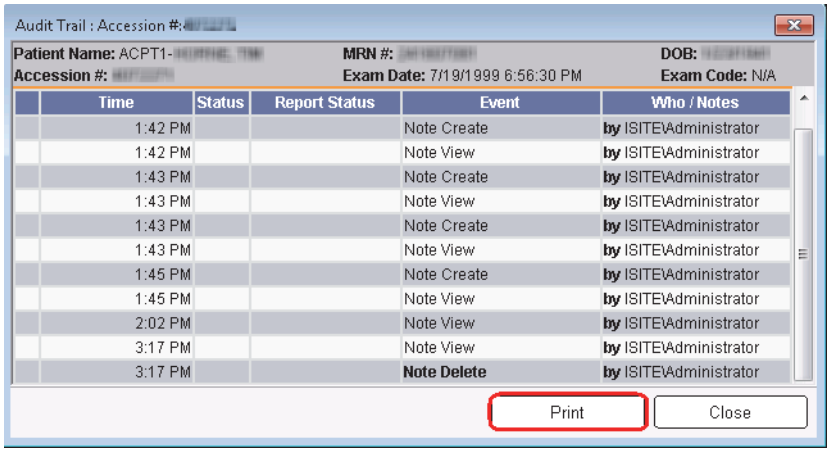
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Creating a patient	Viewing a patient record	Updating a patient record
Deleting a patient	Linking or unlinking a patient	Merging a patient
Creating or deleting an exam	Updating an exam record	Linking or unlinking exams
Viewing an exam	Printing an exam to paper or film	Creating an exception
Scheduling an exam	Dictating an exam	Editing the scheduled date/ time of an exam
Beginning an exam	Canceling an exam	Changing the exam status to Taken
Completing an exam	Force unlocking an exam	Viewing an exam note
Creating an exam note	Deleting an exam note	Viewing an exam report
Finalizing a report	Changing an Exam Code/ Modifier	Resolving an exception and attaching a study to an exam
Opening a report	Transcribing a report	Acknowledging a duplicate UID warning
Detaching a study from an exam	Marking an exam unread	Exporting an exam image to clipboard or disk
Marking an exam read	Deleting an exception/study	Printing an exception to paper or film
Viewing an exception/study	Exporting an exam/study to a network device	Exporting to CD/DVD drive via Media Viewer
Exporting an image to the clipboard or disk	Updating a password	Attempting to do something that might be destructive to the system (for example, an SQL injection)
Logging into or out of the system	Adding, updating, or deleting a presentation state for a study	Changing the UID of a study

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Receiving a query from an known or unknown DICOM device (meaning that device is not correctly configured).	Recovering previously deleted images	Caching an exam locally
Deleting one or more images from a study	Acknowledging a VIP patient warning	Reading VIP patient data
Caching an exception locally	Requesting a VIP patient exam	

In addition, the **Audit Trail** dialog displays the date and time the event occurred, the status of the event (if applicable), report status (if applicable), the type of event, and who performed the event/action. You can also print the Audit Trail.



In the **Audit Trail** dialog, the Accession number is displayed in the title bar. Below that is the Patient Name, MRN #, DOB, Accession #, Exam Date, and Exam Code.

1. Open the **Clinical Information: Exam Notes** dialog.
2. In the bottom left corner of the dialog, click **Audit Trail**.
3. The Audit Trail for the specific Accession # displays.

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4. Review the information displayed.
5. Click **Print** to print the list of events.
6. In the Print dialog, select a Printer and any options you prefer and then click **Print**.
7. When you are done, click **Close** to close the Audit Trail dialog.
8. Click **Close** again to close the Clinical Information: Exam Notes dialog.

8.7 Displaying and Printing the Current Report

If a report exists, the **Diagnostic Report** pane of the **Clinical Information** dialog box displays information in two tabs: **Current** and **History**.

- The **Current** tab displays the exam information, patient information, providers, and report of the Radiologist's impressions for the exam. You can print this report or view it on screen. When you print the report, all information is printed, even if some of the categories are not expanded on screen.
- The **History** tab allows you to see the complete revision history for the report. Medical treatments are based on diagnostic reports. There might be multiple reports for the same exam, potentially with updated information. Therefore, it is important to go back in time to see the full history of reports received for an exam.

WARNING

IntelliSpace PACS stores all timestamp information in GMT. Microsoft Windows then localizes this information so that all timestamps are presented in local time (as configured on the workstation). Because Microsoft may make changes in its operating systems to account for Daylight Savings Time in various time zones around the world, please ensure that user machines have the most current Microsoft updates installed so that correct times are displayed in IntelliSpace PACS reports.

The following information is displayed at the top of the **Diagnostic Report** pane:

- **Patient Information**: Name, MRN, Sex, Birth Date

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- **Provider Information**; Ordering MD, Phone, Pager
- **Exam Information**: Accession Number, Exam Code, Location

1. Display the **Diagnostic Report** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Margin.

     
   - Right-click on an event in the Patient History Timeline on the Canvas Page and select **Show Report**.
   - From the **Patient Lookup**, **Exam Lookup** or a worklist that displays exams and has the **Report Available** column visible, right-click and select **Show Report**.
   - Click **Diagnostic Report** while viewing another pane in the **Clinical Information** dialog box.
2. If desired, click the **+** sign to expand and view the **Exam Information**, **Patient Information**, **Providers**, or **Preliminary Report** sections.
3. Click **Print** for a paper copy of the current report. The printed version includes the patient and exam information, even if these sections are not expanded on screen.
4. Select another pane from the **Clinical Information** dialog box if desired, or click **Close**.

8.8 Displaying Earlier Reports

1. Display the **Diagnostic Report** pane of the **Clinical Information** dialog box in one of the following ways:
   - From the Canvas Page, click the icon in the Exam Rack.
   - Right-click on an event in the Patient History Timeline on the Canvas Page and select **Show Report**.
   - From the **Patient Lookup**, **Exam Lookup** or a worklist that displays exams and has the **Report Available** column visible, right-click and select **Show Report**.

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2. Click the **History** tab. The top part of the window displays information about the previous reports for this exam, including the date and time of the report, the report status (Corrected, Final, or Preliminary), and the name of the provider. When you select a report, the bottom part of the window displays information about the report.
3. Select another pane from the **Clinical Information** dialog box if desired, or click **Close**.

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9 Filtering Worklists

A filter is a named set of search criteria. The key to driving enterprise productivity is to provide easy and consistent search and filter functionality to all users of IntelliSpace PACS so they do not waste time building or editing worklists. IntelliSpace PACS provides extensive search and filter capabilities, and includes some filters you can use to quickly find the exam and/or exception information you are interested in. Three types of filters are available from the Folder List for selecting, saving, and modifying filters. By default, up to 200 exams and/or exceptions display in the worklist. If additional exams or exceptions match your criteria, a message displays to alert you to add more search criteria. You or your System Administrator can create additional filters based on criteria that you intend to use repeatedly.

NOTE ***The maximum number of filters is 250 per type of filter, which means that a total of 750 filters can be created.***

- **User Filters**: You can define personal filters that include read and unread exams, exams and exceptions, or only exceptions. User filters are listed under **My Filters** in the Folder List. In addition, user filters can be organized into folders within **My Filters**.
- **System Filters**: System Administrators can modify the supplied system filters, and create and modify the system filters to be used in their organization. You can use system filters to search for specific exams and/or exceptions. System filters are listed under **System Filters** in the Folder List. In addition, system filters can be organized into folders within **System Filters** in the Folder List.
- **Machine Filters**: System Administrators can create and modify filters for the computer IntelliSpace PACS is running on. These filters are used for computers assigned to workstations attached to specific modalities, and are available to any user on that computer. You can use machine filters to search for specific exams and/or exceptions. Machine filters are listed under **Machine Filters** in the Folder List. See 'Sample Machine Filters for Technologists and Radiologists' (see page 167).

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Worklists display matching exams (if any) on top and exceptions (if any) on the bottom. Each area has a separate set of mandatory and optional columns. You can display exams, exams and exceptions, or only exceptions for new and modified filters.

There are permissions that determine whether you can access the following:

- Manage user filters
- View and manage machine filters
- View and manage system filters

The filters you can add, edit, or delete are based on your privileges. The procedures for creating, editing, deleting, and selecting filters are the same for User, System, and Machine filters. When you select a filter, a list of exams and/or exceptions matching the filter's criteria displays.

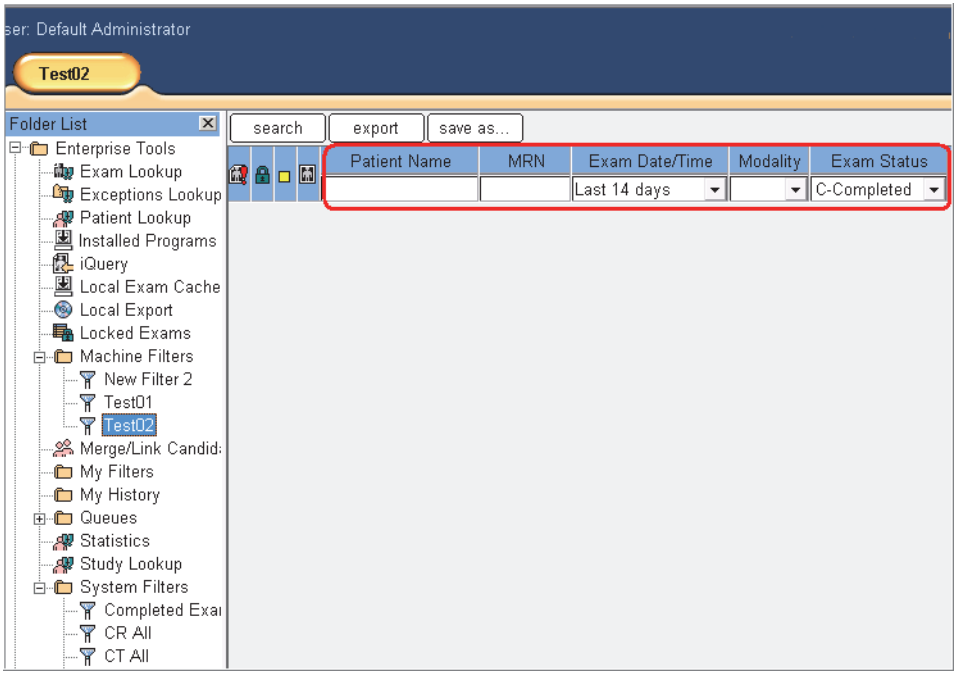


Figure 9.1 Worklist Filters

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9.1 Selecting a Filter

1. From the **Folder List**, click the **+** sign next to the desired filter type:
   - Machine Filters
   - My Filters
   - System Filters
2. Click the filter you want to use to display exams and/or exceptions. The name of the filter displays in the yellow tab above the Shortcuts/Folder List columns and the filter criteria display in the right pane.
3. Click **Search** to generate a query based on the filter criteria.
4. Click **Export** to save the query results as a CSV (comma-separated values) file.
5. Click **Save As** to save as a new filter. The **Add Filter** dialog displays, where you can rename and change the criteria for the new filter.

9.2 Arranging Exam and Exception Columns in a Worklist

Filters have supplied settings. When you open a filter, any changes you make to the column width, sort order, or displayed columns are saved. If the filter is a User or Machine filter and you have privileges to manage these, the worklist header column configuration, which includes visible columns, column order, and column width, is saved when you exit IntelliSpace PACS.

9.3 Showing or Hiding an Exam Worklist Column

1. Right-click in the exam search criteria area. A menu displays, showing a check mark to the left of each displayed column. Column names that always display are grayed out.
2. Select the search criteria you want to show or hide. Displayed icons and search criteria are checked; hidden criteria are unchecked. You cannot hide the fields that are grayed out.

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9.4 Showing or Hiding an Exception Worklist Column

1. Right-click in the column area, above the list of exceptions. A menu displays, showing a check mark to the left of the active criteria type.
2. Select the columns you want to show or hide. Shown columns are checked; hidden columns are unchecked. You cannot hide the fields that are grayed out.

9.5 Rearranging Worklist Columns

You can click and drag columns in an exam or exception worklist to rearrange their order. This allows you to customize in what order exam information is displayed.

Click and drag a column to the position you want, and release the mouse button.

9.5.1 Rearranging a Filter's Columns

1. Right-click the filter in the Folder List and then click **Edit Filter**. The **Add Filter** dialog box displays.
2. Click **Exam Worklist Columns** or **Exception Worklist Columns**, depending on the columns you want to rearrange. The **Worklist Columns** dialog box displays.
3. In the right pane of the dialog, select the column header you want to rearrange and click **Move Up** or **Move Down** until the header is in the desired position. Note that you cannot move required columns and there are limits on how far you can move certain columns.
4. Click **OK** when you are done to save your changes and close the Worklist Column dialog box.
5. Click **Save** to close the Add Filter dialog.

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9.6 Searching in Exam and Exception Worklists

You can search for exams and exceptions in a worklist and either view this information as you are working, or save it as a new filter. Depending on how they are defined, worklists can display one of the following:

- Exams only
- Exceptions only (Resolved or Unresolved)
- Exams and exceptions

Note the following about searching for exams and exceptions:

- For filters displaying exams, exceptions, or both exams and exceptions, you can specify the desired start and end dates by selecting **Custom** from the **Exam Date/Time** list or **Exception Date/Time** list. If a **Custom** date is set to more than 7 days, the filter is not auto-refreshed every one minute. Also, if **All** is selected as the date for the when the worklist is created, the filter is not auto-refreshed every one minute. See 'Creating Filters' (see page 158).
- Only exact matches for Accession # and MRN are supported.
- The maximum number of exams matching your search criteria is configurable. You will be notified if a search returns more exams than the maximum allowed. The message will display the total number of exams returned by the search
- The total number of exception studies matching your search criteria is displayed. The message will display the total number of exceptions returned by the search.

Searching in a Worklist That Only Displays Exams

1. Select a filter from the Folder List that displays exams.
2. Enter the desired search criteria in the search area.
3. Click **Search** or press **Enter**. A list of exams that match your search criteria displays.

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Searching in a Worklist that Only Displays Exceptions

1. Select a filter from the Folder List that displays exceptions.
2. Enter the desired search criteria in the search area.
3. Click **Search** or press **Enter**. A list of exceptions that match your search criteria displays.

NOTE ***Any exception opened from the exception worklist stays highlighted in the list after you have closed the exception, if the exception has not been resolved.***

Searching in a Worklist that Displays Exams and Exceptions

1. Select a filter from the Folder List that displays exams and exceptions.
2. Enter the desired search criteria in the search area for exams, at the top of the window. Note the following about mirrored filter criteria:
   - If any of the following **General** criteria (from the **Add** or **Edit Filter** dialog box) are changed in the Exam worklist results (at the top), that change is mirrored in the Exception worklist results (at the bottom). See 'Creating Filters' (see page 158). These fields are displayed in bold to indicate that their value comes from the Exam worklist results: **Body Part**, **Organization**, **Modality**, and **Performing Resource**.
   - If the **Mirror** field was selected when the filter was created or edited, the **MRN** and/or **Patient Name** fields are mirrored in the worklist. This means that whatever you enter in the MRN and/or Patient Name in the Exam part of the worklist is mirrored in the corresponding field in the Exception part of the worklist. If mirroring is enabled, an icon displays to the left of the **MRN** and/or **Patient Name** field. You can click this icon to disable mirroring, and click it again to re-enable mirroring for that worklist. Clicking this icon does not change the original settings of the filter.
3. Click **Search** or press **Enter**. A list of exams and exceptions that match your search criteria displays.

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The search criteria you enter for exams is translated for exceptions as follows:

Exam Query Fields	Exception Query Fields
Organization	Organization
Modality	Modality
Performing Resource	Performing Resource
Subspecialty	-
Patient Name	Patient name
Date of birth	Date of birth
MRN	MRN
Accession #	Accession #
Exam Date/Time	Exception Date/Time
Procedure Status	-
Procedure Code	-
Body Part	Body Part
Referring Physician (Ordering Provider)	DICOM Tag 0x00080090
Ordering Location	-
Priority	-
Patient Class	-



WARNING

When running a worklist query using a patient's MRN, it is possible that the non-numeric characters may be stripped from the MRN, possibly causing a mismatch of patient data between two or more patients. Make sure you validate the MRN against the patient name to ensure the returned patient data matches the patient you are looking for.

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9.6.1 Searching for Exams or Exceptions by Patient Name

You can use patient names to search for exams or exceptions by entering their last and first name or by using a wildcard search. For example, to find patient Doe, John you can search for the full name (Doe, John), full last name and partial first name (Doe, J) or partial last name (D). There is also a wildcard search option that allows you to search on a partial last name and "%" and partial or full first name (for example "D%, Joh").

NOTE ***You can also search for exams by multiple referring physician names. Separate last names with semi-colons and first and last names with commas (for example, "Smith;Jones" or "Smith,Robert"). You can also include the wildcard character (%) to search for partial last or first names (for example, "Smi%" or "Smi%,Rob%").***

1. Display a filter that displays exams, exceptions, or exams and exceptions.
2. Enter all or part of the patient's last name, followed (optionally) by a wildcard character (%), a comma (,) and all or part of the first name (for example, D%, Jo" would return "Doe, John" and Doplier, Joan").
3. Click **Search** or press **Enter**. Exams or exceptions for patients in the specified time or date range are displayed.

9.6.2 Searching for Exams or Exceptions by Date

You can specify a supplied date/time names to search for exams or exceptions, or specify a custom date range using a calendar control.

NOTE ***When you enter an MRN or Accession #, the date range you specify is not used in the search.***

1. Display a filter that displays exams, exceptions, or exams and exceptions.
2. In the **Date/Time** column, select a time or date range.
3. Click **Search** or press **Enter**. Patients with exceptions who match the name search criteria are displayed.

NOTE ***The Today item in Exam Date/Time, Exception Date/Time, or Filter Date filters on all items that are available for today, starting from 00:00 a.m. until 23:59 p.m.***

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9.6.3 Searching for Exams or Exceptions Using a Custom Date Range

1. Display a filter that displays exams, exceptions, or exams and exceptions.
2. In the **Date/Time** column, select **Custom**. A **Start Date** and **End Date** window displays a range of Today's date for both start date and end date. If a **Custom** date is set to more than 7 days, the filter is not auto-refreshed every one minute. Also, if **All** is selected as the date for the when the worklist is created, the filter is not auto-refreshed every one minute.
3. Enter the desired start and end dates, or click the arrow for either date to enter the date using the calendar control.
4. Click **OK** when you have entered the desired dates.
5. Click **Search** or press **Enter**. IntelliSpace PACS displays matching exams and exceptions for patients in the specified date range.

9.6.4 Stripping Leading Zeros from MRN Searches

You can choose whether or not to have the client application strip leading zeros from MRN searches. The option is off (disabled) by default, but you can ask CARE to enable it if you want this option. With this option disabled (off—the default state):

- You can enter any text value in the MRN search field. Explicit wildcards (e.g., %,?) are allowed, and the client appends implicit wildcards.
- In a search, the client application does not strip leading zeros; only patients with MRNs starting with or equal to the exact MRN search value are returned.

With this option enabled (on):

- You can enter only a numerical value in the MRN search field. Explicit wildcards (e.g., %,?) are not allowed, and the client application does not add implicit wildcards. If you enter any character other than 0 through 9, an error message is displayed.

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- In a search, the client application removes leading zeros from the search value you entered, and the resulting value is matched against the numeric version of each MRN in the database (i.e., the MRN with all non numbers and leading zeros removed). Because wildcards are not supported, the entire numeric MRN must be entered to get a match.

9.7 Sorting Results

By default, the selected sort column is set to display all exams on top. Clicking the column header in the exam or exception worklist sorts the contents of the worklist using the selected header as the primary sort column. Clicking the current sort column toggles the sort order between ascending and descending.

The secondary sort criteria for Exam and lookup filters is the Exam Date/Time descending (with newest exams on top). Exceptions are sorted by Exception Date/Time descending (with newest exceptions on top).

Click the blue column heading that you want to sort by. An arrow appears in the column heading to display whether the order is ascending (A-Z or 1-9) or descending order (Z-A or 9-1). To reverse the order, click the same column heading again.

9.8 Creating Filters

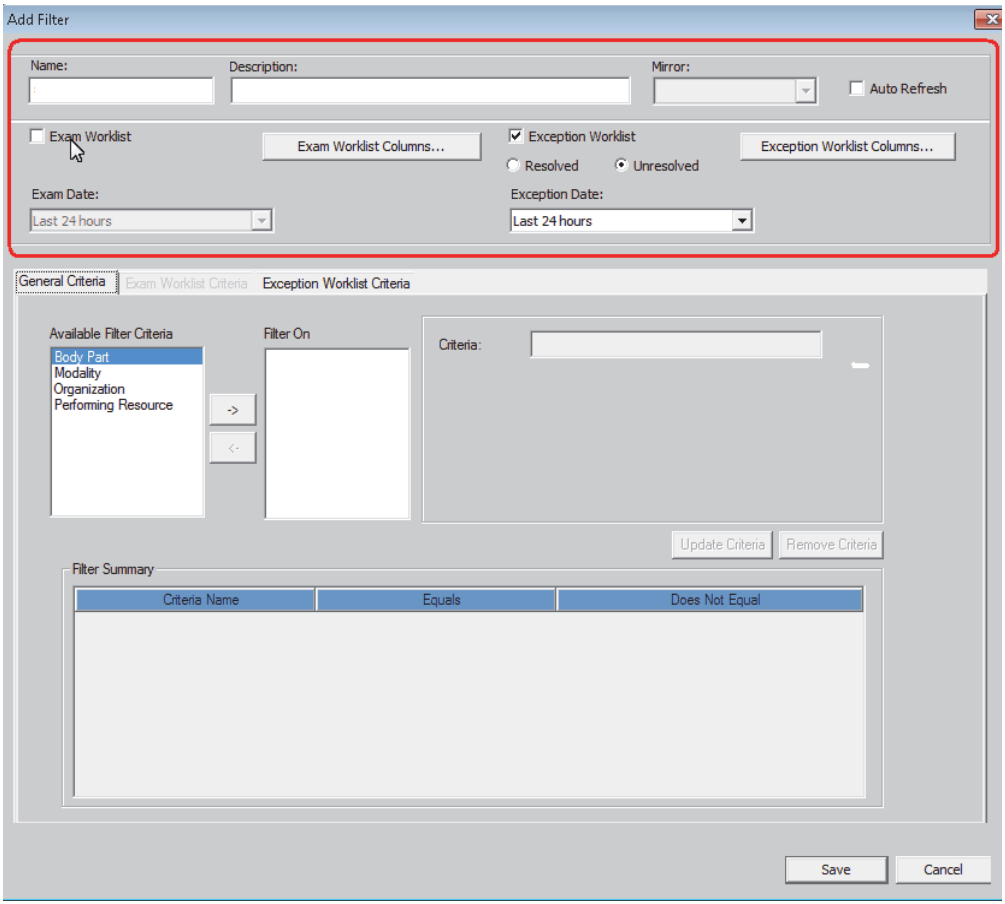
You can create filters in one of the following ways:

- By selecting an existing filter from the Folder List and clicking the **Save As...** button in the right pane (above the filter criteria), which opens the **Add Filter** dialog.
- By right-clicking **Machine Filters**, **System Filters**, or **My Filters** in the Folder List, selecting **Create Filter** in the right-click menu, defining the filter criteria in the **Add Filter** dialog box, and saving the filter.

See ‘Sample Machine Filters for Technologists and Radiologists’ (see page 167). See ‘Commas Used as Delimiters in Filters’ (see page 168).

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1. Select a filter from the Folder List.
2. Click **Save As**. The **Add Filter** dialog box displays.



3. Enter the **Name** and **Description** for the new filter. The **Name** is required.
4. Select whether you want the **MRN** and/or the **Patient Name** to be mirrored from the Exam worklist to the Exception worklist. The **Mirror** field is only enabled when you add or edit a filter that contains both exams and exceptions. When you are using the filter, you can change the mirroring properties for these fields after the filters have been defined.

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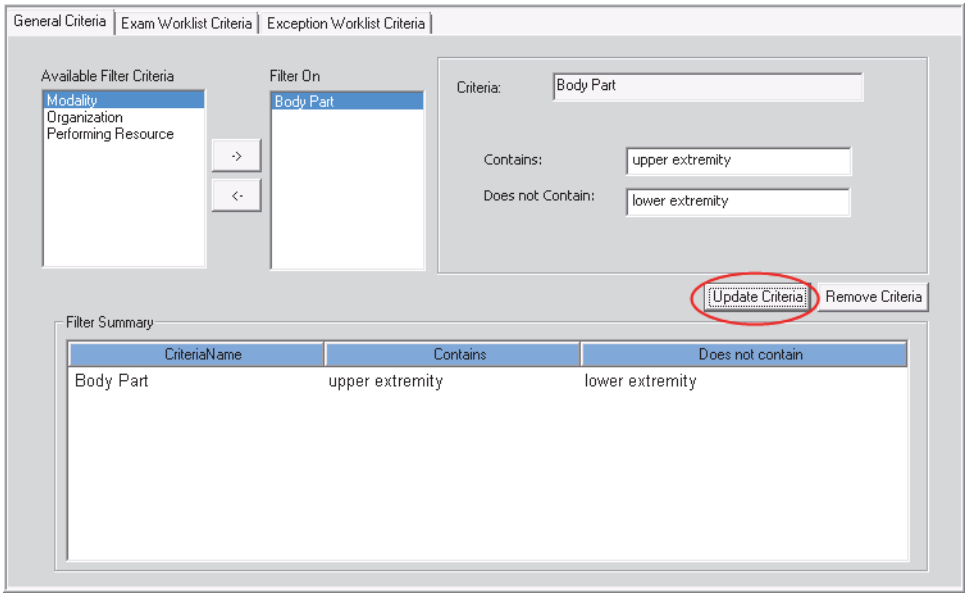
5. Select whether you want the filter to be refreshed with updated information every 1 minute by selecting the **Auto-refresh** check box. This setting is applied to all filters for all ranges, except **Custom** date ranges you set in the Exam or Exception worklist. If a **Custom** date is set to more than 7 days, the filter is not auto-refreshed. Also, if **All** is selected as the date for the when the worklist is created, the filter is not auto-refreshed every one minute.
6. In the **General Criteria** tab, select one of the Available Filter Criteria – **Body Part**, **Modality**, **Organization**, and **Performing Resources** – and click **->** to move it to the Filter On column.

   When adding a **Performing Resource** in the **General Criteria** tab, you can use a dictionary picker to select or remove criteria. To do this, press the button to the right of **Equals** or **Does Not Equal**. This opens the **Performing Resources** dictionary, enabling you to search for the Performing Resources you want to add or remove. Enter search values in the **Organization**, **Code**, and **Description** fields, then click **Search**. You can use the **Apply** button to add or remove multiple Performing Resources. When you are done, click **OK**. The criteria is added to the **Filter Summary**.

   When adding a **Body Part** in the **General Criteria** tab, you can select a pre-defined body part from a drop-down list in the **Equals** or **Does Not Equal** field. You can also enter a free-text for the body part name.
7. The name of the criteria (for example, Body Part) also displays in the Criteria field as well as in the Filter Summary field.

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8. In the **Equals** and **Does not Equal** fields, enter additional parameters. Click **Update Criteria** when done, and those parameters display in the Filter Summary.



9. You can add more criteria from the Available Filter Criteria list by following Steps 4 through 6. To remove a criteria, select it in the **Filter Summary** and click **Remove Criteria**.

10. Optionally, to create an Exam Worklist filter, do the following:

    - The **Exam Worklist** check box is selected by default, which includes exams with or without images in the new filter. However, you can also select **Exception Worklist** or you can select both.
    - Select the **Exam Date** from the dropdown list.
    - Click the **Exam Worklist Criteria** tab and then select values from the **Available Filter Criteria** list. Click the **->** arrow to move these values to the **Filter On** column, which then automatically populates the **Criteria:** and **Filter Summary** fields.

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- When adding an **Ordering Location**, **Exam Code**, or **Referring Physician** from the **Exam Worklist Criteria**, you can use a dictionary picker to select or remove criteria. To do this, press the button to the right of **Equals** or **Does Not Equal**. This opens the specified dictionary, enabling you to search for the items you want to add or remove. Enter search values in the dictionary window, then click **Search**. You can use the **Apply** button to add or remove multiple items. When you are done, click **OK**. The criteria is added to the **Filter Summary**.
- When adding an **Ordering Location** or **Exam Code** from the **Exam Worklist Criteria**, you can use a dictionary picker to select or remove criteria. To do this, press the button to the right of **Equals** or **Does Not Equal**. When adding a **Referring Physician**, press the button to the right of **Contains** or **Does Not Contain**. This opens the specified dictionary, enabling you to search for the items you want to add or remove. Enter search values in the dictionary window, then click **Search**. You can use the **Apply** button to add or remove multiple items. When you are done, click **OK**. The criteria is added to the **Filter Summary**.
- You can enter comma-separated multiple values for the **Exam Code**, **Ordering Location**, and **Subspecialty** fields. For the **Referring Physician** field, use a comma between the first name and last name and a semi-colon (;) between pairs of first and last names.
- Enter additional parameters in the **Equals** and **Does Not Equal** text fields and click **Update Criteria**.
- Click **Exam Worklist Columns** to define the columns for the worklist display. See 'Specifying the Columns for an Exam Worklist' (see page 163).

11. Optionally, to create an Exception Worklist filter, do the following:

- Select the **Exception Worklist** check box and choose **Resolved** or **Unresolved** if you want exceptions to be included in the new filter.
- Select the **Exception Date** from the dropdown list.

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- Click the **Exception Worklist Criteria** tab and then select values from the **Available Filter Criteria** list. Click the **->** arrow to move these values to the **Filter On** column, which then automatically populates the **Criteria:** and **Filter Summary** fields. You can create the following filters for exams, unresolved exceptions, and resolved exceptions: Exam (Unresolved Exceptions), Exams Only, Unresolved Exceptions Only, Exam (Resolved Exceptions), Resolved Exceptions Only.
- Enter additional parameters in the **Equals** and **Does Not Equal** text fields and click **Update Criteria**.
- Click **Exception Worklist Columns** to define the columns for the worklist. See 'Specifying the Columns for an Exceptions Worklist' (see page 164).

12. When you are done selecting the criteria for the new filter, click **Save**. The list of exams and/or exceptions is sorted based on the filter you created, and the filter name is added to the Folder List for future use or modification.

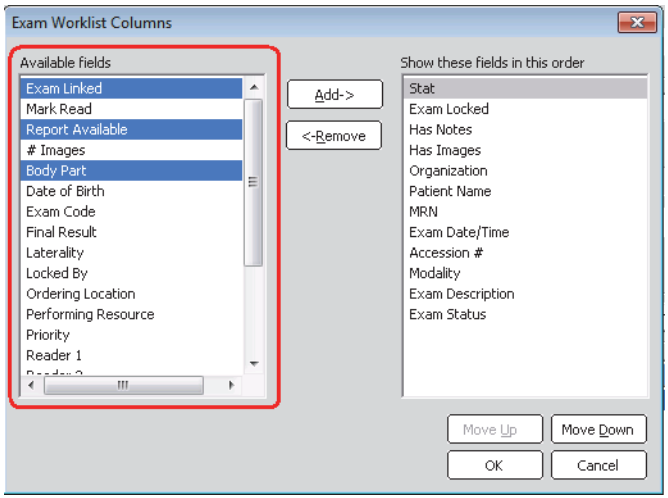
NOTE ***If you add a new filter while a filter worklist is open, that page will be closed and you are returned to the parent folder.***

9.8.1 Specifying the Columns for an Exam Worklist

1. From the **Add Filter** dialog box, check **Exam Worklist**.

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2. Click **Exam Worklist Columns**. The **Exam Worklist Columns** dialog box displays.



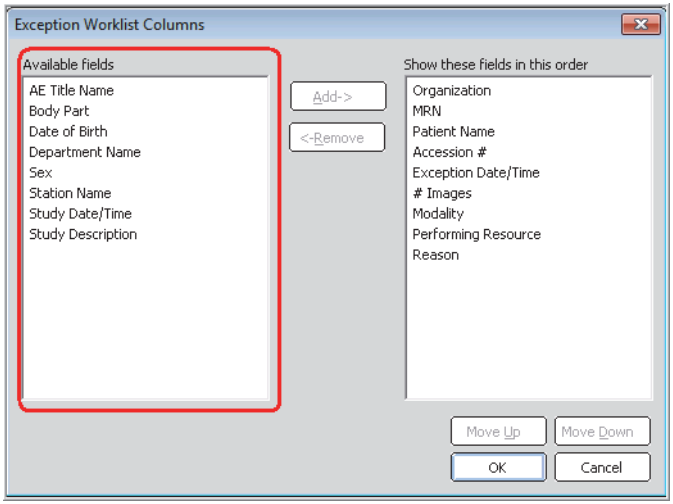
3. Optionally, do the following:
   - In the **Available fields** column, select the desired fields using **Ctrl-click** and then click **Add** to define the list of columns you want for the exam worklist. The names in the right column are the ones used in the worklist. Note that you cannot remove the columns for **MRN**, **Exam Date/Time**, **Accession #**, or **Modality**, as they are required columns.
   - Select a field in the right column and click **Move Up** or **Move Down** to rearrange the displayed columns.
   - Select an optional field in the right column and then click **Remove** to move it out of the right column.
4. When you are done, click **OK**. You are returned to the **Add Filter** dialog box.

9.8.2 Specifying the Columns for an Exceptions Worklist

1. From the **Add Filter** dialog box, check **Exception Worklist**.

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2. Click **Exception Worklist Columns**. The **Exception Worklist Columns** dialog box displays.

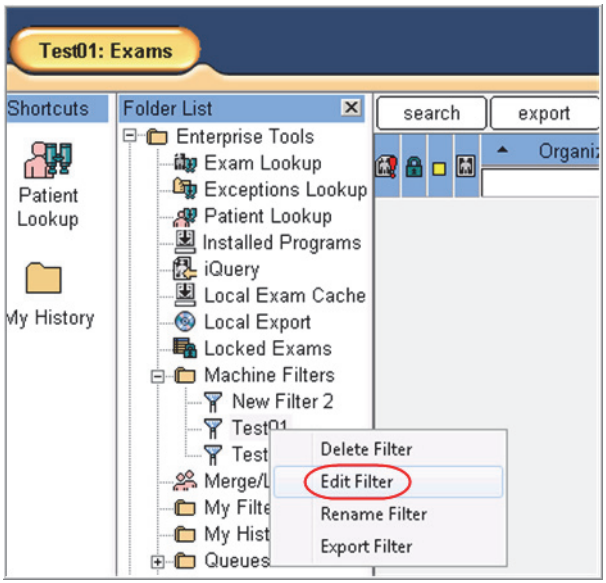


3. Optionally, do the following:
   - In the **Available fields** column, select the desired fields using **Ctrl-click** and then click **Add** to define the list of columns you want for the exception worklist. The names in the right column are the ones used in the worklist. Note that you cannot remove the columns for **MRN**, **Exception Date/Time**, **Accession #**, or **Modality**, as they are required columns.
   - Select a field in the right column and click **Move Up** or **Move Down** to rearrange the displayed columns.
   - Select an optional field in the right column and then click **Remove** to move it out of the right column.
4. When you are done, click **OK**. You are returned to the **Add Filter** dialog box.

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9.9 Editing a Filter

1. In the Folder List, right-click the filter you want to edit and then click **Edit Filter**.



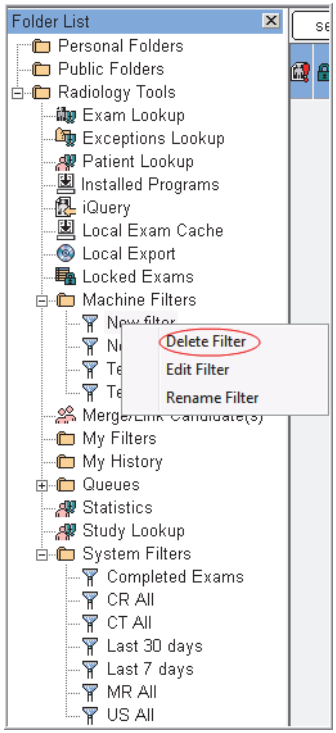
2. The **Add Filter** dialog box displays.
3. Make the desired edits to the fields in the **Add Filter** dialog box, including defining or rearranging exam or exception worklist columns by clicking **Exam Worklist Columns** or **Exception Worklist Columns**, respectively.
4. When you are finished editing the filter, click **Save**.

9.10 Deleting a Filter

If you have the proper privileges, you can delete filters from the Folder List.

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1. To delete a filter from the Folder List, select the filter, right click, and select **Delete Filter**.



2. When asked “Are you sure you want to delete filter <FilterName>?”, click **Yes**. The filter is removed from the list.

9.11 Sample Machine Filters for Technologists and Radiologists

Technologists and radiologists can create and use machine filters to customize IntelliSpace PACS for their needs.

Technologists can create machine filters based on the following criteria to allow them to link exams, create presentation states, create exam notes, and perform quality assurance:

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- **Has Images** field set to **With Images**
- **Status** field set to **S - Scheduled**, **I - In Progress**, and **T - Taken**.
- **Mark Read** field set to **Unread exams**
- Include Exceptions by AE Title

Radiologists can create machine filters for reading based on the following criteria:

- **Has Images** field set to **With Images**
- **Status** field set to **C - Completed**
- **Mark Read** field set to **Unread exams**

9.11.1 Commas Used as Delimiters in Filters

For the Ref. Phys. Name field, IntelliSpace PACS interprets search strings according to the following conventions:

- IntelliSpace PACS treats commas (,) as delimiters:
  - If the search string does not contain a comma, IntelliSpace PACS interprets the character string as the physician's Last Name.
  - If the search string contains a comma, IntelliSpace PACS interprets any character string before the comma as the physician's Last Name, and any character string after the comma as the physician's First Name.
  - IntelliSpace PACS ignores characters after any additional commas.
- IntelliSpace PACS treats percent characters (%) as wildcards:
  - If the search string does not contain a wildcard, IntelliSpace PACS searches for an exact match.
  - If the search string contains one or more wildcards, IntelliSpace PACS searches for results that contain the search string in the position indicated by the wildcard(s).

When you design your filters, keep in mind that search results also depend on how the Ref. Phys. Name data is stored in the IntelliSpace PACS database. If the referring physician's Last Name or First Name is stored in the database

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with extra characters, the filter may not return the results you expect from the search string you enter. For example, if the Last Name stored in the database is “Smith,M.D.” you cannot find this physician by entering “Smith,M.D.” as the search string in your filter; if you do, IntelliSpace PACS searches for a physician whose Last Name is “Smith” and whose First Name is “M.D.” because IntelliSpace PACS interprets the comma in the search string as a delimiter between those two values.

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10 Finding and Managing Exceptions

10.1 Exceptions Lookup Overview

You use the **Exceptions Lookup** to find and manage exceptions. Exceptions occur when there is a mismatch between the "gold copy" in the IntelliSpace PACS database and the modality metadata (information sent by the modality, sometimes called a "digital flashcard"), for example when:

- An MRN (medical record number) does not exist in IntelliSpace PACS
- An ACC (accession number) does not exist in IntelliSpace PACS
- The MRN and Accession # pair is invalid

When these situations occur, a provider cannot know with certainty the patient to whom the images belong. Because there is no way to automatically determine the correct patient, each exception must be reviewed and resolved before its associated images are linked with data from your HIS/RIS. Ideally, the technologist who created an exception resolves the problem immediately at the workstation. If the technologist does not resolve the exception, the exam is not available for interpretation.

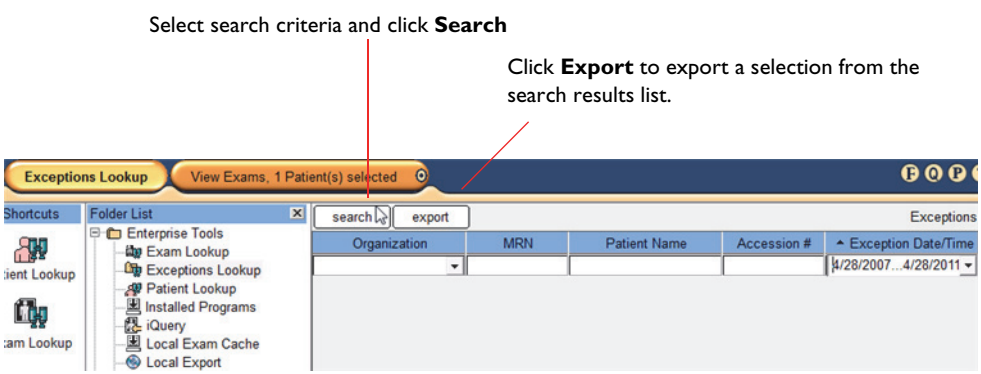


Figure 10.1 Exceptions Lookup

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You can use the **Exceptions Lookup** to quickly find exceptions based on a combination of search criteria. You can search for exceptions using any combination of the following criteria. The search criteria in bold below must be displayed at all times:

- Organization
- Body Part
- **MRN**
- **Patient Name**
- **Accession #**
- Date of Birth
- Study Date/Time
- **Exception Date/Time**
- Number of Images
- **Modality**
- Performing Resource
- Reason
- Department Name
- Station Name
- AE Title Name

Note the following about searching for exceptions:

- A date range is not required.
- Only exact matches for Accession # and MRN are supported.
- If you search by Accession # or MRN, the date range is ignored.
- The total number of exception studies matching your search criteria is displayed.
- If more exception studies match your criteria than can be displayed, a message displays in the Control Strip.

NOTE ***The algorithm used to resolve exceptions uses the MRN and ACC#. Before resolving the exception, you should open the images in question in IntelliSpace PACS Radiology to verify matching of the patient demographics.***

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You use the **Exceptions Handler** to resolve exceptions. See 'Using the Exceptions Handler' (see page 180). You use the **Resolved Exceptions** worklist to view a list of all resolved exceptions. See 'Working with Resolved Exceptions' (see page 185).

10.2 Searching for Exceptions

1. Select **Exceptions Lookup** from the Folder List (or the Shortcut Bar list if you have created a shortcut for this feature).
2. Enter the desired search criteria. (Note that you cannot use **Patient Sex** or **# Images** as a search criteria.) You can use wildcard searches using patient name, MRN, or Accession # in the **Exceptions Lookup** (for example, an MRN of 1234 returns matching MRNs 123456 and 123498). To search for exceptions from all dates, select the Exception Date/Time value and press the Delete key.
3. Click **Search**. A list of exceptions that match your search criteria is displayed. The upper-right corner of the **Exceptions Lookup** also displays the total number of exceptions found. You can do the following:
   - Right-click to display a menu with actions.
   - Rearrange, re-size, and select certain search criteria columns to hide or display.
   - **Shift-click** to select contiguous exceptions or **Ctrl-click** to select multiple, non-contiguous exceptions.

NOTE ***Any exception opened from the exception worklist stays highlighted in the list after you have closed the exception, if the exception has not been resolved.***

10.2.1 Searching for Exceptions by Patient Name

You can use patient names to search for exceptions by entering their last and first name or by using a wildcard search. For example, to find patient Doe, John you can search for the full name (Doe, John), full last name or partial first name (Doe, J) or partial last name (D). There is also a wildcard search option that allows you to search on a partial last name and "%" or partial or full first name (for example D%, Jo).

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1. If it is not already displayed, select **Exception Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. Enter all or part of the patient's last or first name. To search for exceptions from all dates, select the **Exception Date/Time** value and press the **Delete** key.
3. Click **Search**. Exceptions for patients in the specified time or date range are displayed. The upper-right corner of the **Exceptions Lookup** also displays the total number of exceptions found. You can do the following:
   - Right-click to display a menu with actions.
   - Rearrange and select certain search criteria columns to hide or display.
   - **Shift-click** to select contiguous exceptions or **Ctrl-click** to select multiple, non-contiguous exceptions.

10.2.2 Searching for Exceptions by Exception Date/Time

You can specify a supplied date/time to search for exceptions, or specify a custom date range using a calendar control. Note that when you enter an Accession #, the date range you specify is not used in the search.

1. If it is not already displayed, select **Exception Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. In the **Date/Time** column, select an **Exception Date/Time** range from the list. Note that the time is when IntelliSpace PACS receives the images, not the time when the images were acquired.
   - **Note:** You can use the **Delete** key and search for all exceptions, regardless of date. You cannot type a date in this field or use **Ctrl-X** or **Backspace** to clear the field.
3. Click **Search** or press **Enter**. Patients with exceptions who match the name search criteria are displayed. The upper-right corner of the **Exceptions Lookup** also displays the total number of exceptions found. You can do the following:
   - Right-click to display a menu with actions.
   - Rearrange and select certain search criteria columns to hide or display.

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- **Shift-click** to select contiguous exceptions or **Ctrl-click** to select multiple, non-contiguous exceptions.

10.2.3 Searching for Exceptions Using a Custom Date Range

1. If it is not already displayed, select **Exception Lookup** from the Folder List (or the Shortcut Bar if you have created a shortcut for this feature).
2. In the **Date/Time** column, select **Custom**. A **Start Date** and **End Date** window displays a range of Today's date for both start date and end date. If a **Custom** date is set to more than 7 days, the filter is not auto-refreshed every one minute.
3. Enter the desired start and end dates, or click the arrow for either date to enter the date using the calendar control.
4. Click **OK** when you have entered the desired dates.
5. Click **Search** or press **Enter**. Exceptions for patients in the specified date range are displayed. The upper-right corner of the **Exceptions Lookup** also displays the total number of exceptions found. You can do the following:
   - Right-click to display a menu with actions.
   - Rearrange and select certain search criteria columns to hide or display.
   - **Shift-click** to select contiguous exceptions or **Ctrl-click** to select multiple, non-contiguous exceptions.

10.3 Showing or Hiding Exception Lookup Columns

1. Right-click in the column area, above the list of exceptions. A menu displays, showing a check mark to the left of the active criteria type.
2. Select the columns you want to show or hide. Shown columns are checked; hidden columns are unchecked.
3. Repeat steps 1 and 2 as required.

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10.4 Rearranging Exception Lookup Columns

You can click and drag **Exception Lookup** columns to rearrange their order. This allows you to customize in what order exception information is displayed.

- Press and drag a column to the position you want, and release the mouse button.

10.5 Sorting Results

By default, the selected sort column is set to display all exams on top. Clicking the column header in the exam or exception worklist sorts the contents of the worklist using the selected header as the primary sort column. Clicking the current sort column toggles the sort order between ascending and descending.

Exceptions are sorted by Exception Date/Time descending (with newest exceptions on top).

NOTE ***You cannot sort the Sex, # Images, or Study Description columns.***

Click the blue column heading that you want to sort by. An arrow appears in the column heading to display whether the order is ascending (A-Z or 1-9) or descending order (Z-A or 9-1). To reverse the order, click the same column heading again.

10.6 Exception Resolution Overview

Exceptions occur when there is a mismatch between the "gold copy" in the IntelliSpace PACS database and the modality metadata (information sent by the modality, sometimes called a "digital flashcard"). This can happen for a number of reasons, depending on configuration and external system behavior. It is critical that DICOM studies are associated with the proper patient and procedure, to avoid the presentation of images with the wrong patient. You use the **Exceptions Lookup** to find exception studies. See 'Exceptions Lookup Overview' (see page 171).

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If you have the correct access privileges, you can use the **Exceptions Handler** to resolve exceptions by associating received DICOM studies with patients and procedures in the system database. You can also delete exception studies if they cannot be resolved. See 'Deleting Exception Studies' (see page 187).

When an exception occurs, the provider cannot know with certainty the patient to whom the images belong. Because there is no way to automatically determine the correct patient, each exception must be reviewed and resolved before the associated images are linked with data from your HIS/RIS. Typically, the Technologist who creates an exception resolves the problem immediately at their workstation. If the exception is not resolved, it is not available to be marked read for interpretation. Some common causes for exceptions are detailed in the following chart.

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Common Causes for Exceptions	
The technologist enters incorrect patient demographics, such as the wrong MRN or the Accession # is missing.	If this happens, IntelliSpace PACS cannot safely associate the study to the exam because the data was entered incorrectly. This problem is due to human error.
A DICOM study is received from a modality that is not receiving patient and order information from the HIS/RIS.	In this case, IntelliSpace PACS creates an exception if it cannot safely create a new patient, match an existing patient, or create a new procedure in the auto-create ORG (organization) of the sending modality.
A DICOM study is received from a 3rd-party archive and no matching patient record is found.	The only likely reason a study would come from a 3rd-party archive is as a prior for an unread procedure. In this case, IntelliSpace PACS creates an exception if the patient or order associated with the study cannot be identified.
A DICOM study is received before the exam information is received from the HIS/RIS.	In this case, when the IntelliSpace PACS receives the HIS/RIS feed, IntelliSpace PACS automatically resolves the exceptions to the newly received exam.
The original exam is canceled because the ordered exam is not correct.	The study becomes an exception and must be manually reconciled to the corrected exam.

When the images have been deleted, the **Resolve Exception** option is not available when you right-click on the exception. See section 7.12 'Deleting Exams' on page 117 for more information about deleting exams.

Mismatch scenarios are categorized as one of the following:

- **Duplicate UID (DUP UID)**: See 'Resolving Duplicate UIDs' (see page 323).
- **ACC Not Entered**: The exam does not have an Accession #.
- **MRN Not Entered:** The exam does not have an MRN**.**

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- **Accession # Not Found**: The Accession # associated with a study is not in the IntelliSpace PACS database. See 'Resolving Accession # Not Found Exceptions' (see page 183).
- **MRN Not Found**: The MRN associated with a study is not in the IntelliSpace PACS database. See 'Resolving MRN Not Found Exceptions' (see page 184).
- **Accession and MRN Mismatch**: Both the Accession # and MRN associated with a study are in the database, but they belong to different exams. See 'Resolving Accession and MRN Mismatch Exceptions' (see page 184).
- **Accession # and MRN Not Found**: Both the Accession # and MRN associated with a study are not found in the database. See 'Resolving Accession and MRN Not Found Exceptions' (see page 185).
- **System Errors**: Used for additional exception types. A single tab of potential matching exams is displayed in the **Exceptions Handler** for these exceptions.



You need to know the following information to use the Exceptions Handler safely in a live clinical environment. If you do not understand any of these warnings or how they affect you, contact your IntelliSpace PACS System Administrator or Philips Customer Care.

- ***To avoid unauthorized access to imaging exceptions, do not leave a computer unattended while the Exceptions Handler is running. As a user of the Exceptions Handler, you assume responsibility for unauthorized access as long as you are logged in to the program. Before leaving a workstation, you should close the Exceptions Handler and log out of IntelliSpace PACS.***
- ***When an exception is resolved, IntelliSpace PACS discards the original scanner information and replaces it with information from the HIS/RIS, resulting in a complete loss of scanner information. If an exception was resolved in error and the exception is later unresolved by unlinking the exam from the image (resulting in a user-created or manual exception), the window now displays the HIS/RIS information that replaced the scanner information when the exception was originally resolved. This makes resolving the exception difficult because the HIS/RIS information is no longer accurate for this exception. IntelliSpace PACS retains the HIS/RIS data because the original scanner information was discarded upon the***

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initial resolution of the exception and there is no other data in the database to associate with the exception. Therefore, we strongly recommend that care be taken when resolving exceptions to avoid the loss of original image header information captured at the scanner.

- ***Please take care when resolving exceptions to exams that have already been dictated or marked read. Philips encourages customers to notify the responsible reading Radiologist of the exception images being added to the exam, because these images may not have been viewed at the time of dictation.***

10.7 Using the Exceptions Handler

The **Exceptions Handler** is divided into two parts:

- The top part displays the exception reason and the images of the exception study with the associated data fields (**Accession #**, **MRN**, **Patient Name**, **Exam Date/Time**, **Modality**, and **Body Part**).
- The bottom part displays a list of potential exams and/or patients to match to the exception study. One or two tabbed lists display: **Exams that match Accession #** and **Exams that match MRN**. IntelliSpace PACS configures the search criteria for these lists. If there are images associated with the exam, you can double-click the item to view the images.

The following fields are shown under the images:

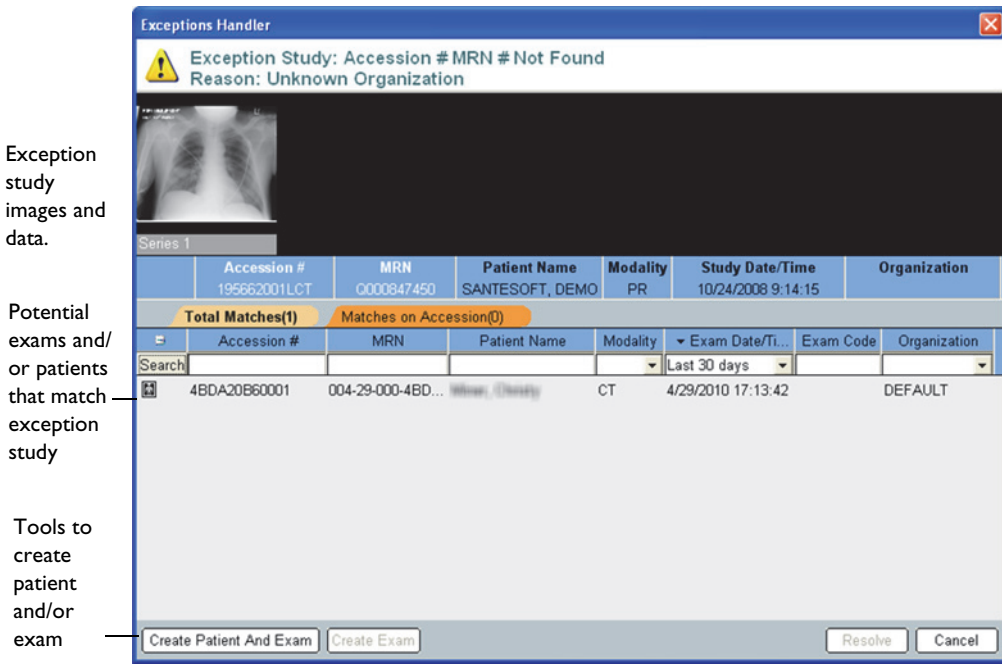
- Images icon, if the exam has images associated with it
- Accession #
- MRN
- Patient Name (Last Name, First Name, Middle Name)
- Modality
- Exam Date/Time
- Exam Code
- Organization
- Exam Description (based on Exam Code)

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- A button or menu item to allow opening the Clinical Information dialog. This is not visible if the user does not have the rights to view it.

Optional fields:

- Body Part
- Subspecialty



Exception study images and data.

Potential exams and/or patients that match exception study

Tools to create patient and/or exam

NOTE ***Refer to your local policy on creating new exams in IntelliSpace PACS before using the Create Patient and Exam feature. If you have HIS/RIS integration, patients and exams created in IntelliSpace PACS will not be synchronized with your HIS/RIS.***

WARNING ***Make sure you associate the exception study with the correct patient or exam.***

1. Use the **Exception Lookup** to search for exception studies.
2. Select an exception that has images associated with it and right-click. From the menu, select **Resolve Exception**. The **Exceptions Handler** displays.

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3. Review the top part of the **Exceptions Handler** to see the images of the exception study with the associated information. Suspect fields are highlighted.
4. If desired, click **Generate** to generate the Accession #. The accession number is generated based on the Prefix/Current Value settings configured for the noted organization in the IntelliSpace PACS AdminTool. The maximum length is 20 characters.
5. If desired, double-click an image to open an image popup window. Right-clicking in the popup window displays a menu with the following options:
   - **Window Width/Window Level**: See 'Setting the Window Width/Level' (see page 231)
   - **Image Processing**: See 'Image Processing' (see page 236)
   - **Play Cine Loop:** Activates the cine loop. Right-click the image again to stop it.
   - **Save**: Saves the image to the clipboard or a file.
   - **Zoom Presets:** Allows you to select a preset zoom factor of **Fit to Window**, **100% (Original Size)**, **True Size**, **200%**, **300%**, or **400%**
6. Review the bottom part of the **Exceptions Handler** to see the potential exam matches that IntelliSpace PACS suggests, based on either Accession # or MRN. Use the open search fields to manually search for matching exams. If you enter an MRN or Accession #, IntelliSpace PACS disables the **Exam Date/Time** field, and therefore, the exam date/time criteria is excluded from your query. If you only search by MRN or Patient Name, patients without exams are displayed.
   - An Image icon displays to the left of the exam if there are images.
   - A Patient icon displays to the left of the name if the patient does not have any exams. You can create exams for patients without exams by selecting the name and clicking **Create Exam**.
   - A visual indicator is displayed for patients with exams. This indicator can be expanded or collapsed. Exams are grouped and displayed in descending order of the exam date and time.

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- If there is no value in the **Exam Date/Time** column, all other columns except **MRN**, **Accession#**, **Patient Name** and **Organization** are disabled and are not considered when performing the search.

7. Double-click on any item in a potential match to view the images associated with it. This displays a new tab in the bottom pane that displays the images, allowing you to compare the images in the top and bottom part of the **Exceptions Handler**. The **Accession #**, **MRN**, **Patient Name**, **Exam Date/Time**, **Modality**, **Organization, Body Part, Exam Description,** and **Exam Code** are displayed for the images.
8. If you cannot find a patient or exam to associate with the study, click **Create Patient and Exam**. See 'Creating a New Patient and Exam from the Exceptions Handler' (see page 189). If you can find a patient, but not an exam, click **Create Exam**. See 'Creating a New Exam from the Exceptions Handler' (see page 190).
9. When you have found a match, click **Resolve**. A message displays asking you to confirm the action.
10. Click **OK**. The exception is resolved and any image popup windows you opened are closed.

NOTE ***Any exception opened from the exception worklist stays highlighted in the list after you have closed the exception, if the exception has not been resolved.***

10.7.1 Resolving Accession # Not Found Exceptions

The mismatch scenario **Accession # Not Found** means that the Accession # of a study cannot be found in the IntelliSpace PACS database. To resolve this exception, you must search the IntelliSpace PACS database with the MRN that was attached to this study. The most likely exam is the one without images, though this is not always the case.

1. Use the **Exception Lookup** to search for exception studies.
2. Select an exception and right-click. From the menu, select **Resolve Exception**. The **Exceptions Handler** displays.

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3. Select an item in the candidate list and click **Resolve**. IntelliSpace PACS replaces the study's current Accession # with the number you selected. If you search for and select a different exam from another patient, IntelliSpace PACS replaces both the Accession # and the MRN in the study with those from the selected exam.

10.7.2 Resolving MRN Not Found Exceptions

The mismatch scenario **MRN Not Found** means that the MRN of a study cannot be found in the IntelliSpace PACS database. To resolve this exception, you must search the IntelliSpace PACS database for an exam to match this study to. Usually, the most likely matching exam for this exception is the one with the same Accession # but with a different (but correct) MRN.

1. Use the **Exception Lookup** to search for exception studies.
2. Select an exception and right-click. From the menu, select **Resolve Exception**. The **Exceptions Handler** displays.
3. Select an item in the candidate list and click **Resolve**. IntelliSpace PACS replaces the study's current MRN with the number you selected. If you search for and select a different exam from another patient, IntelliSpace PACS replaces both the Accession # and the MRN in the study with those from the selected exam.

10.7.3 Resolving Accession and MRN Mismatch Exceptions

The mismatch scenario **Accession # and MRN Mismatch** means that both the Accession # and MRN exist in the IntelliSpace PACS database, but the exam indicated by the Accession # has a different MRN attached to it. To resolve this exception, you must find the correct exam to attach the study to. You can resolve this exception in one of two ways:

- Choose from a list of exams with an MRN that is the same as the one attached to the study, or search for an exam.
- Choose the exam with the same Accession # that is attached to the study.

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10.7.4 Resolving Accession and MRN Not Found Exceptions

The mismatch scenario **Accession # and MRN Not Found** means that both the Accession # and MRN do not exist in the IntelliSpace PACS database. You can resolve this exception in one of two ways:

- Find a different exam for a different existing patient by entering search criteria and searching manually for an existing exam.
- Create a new patient and exam.

10.8 Working with Resolved Exceptions

The **Resolved Exceptions** worklist is an audit log of exceptions that have been resolved. This worklist gives Technologists and PACS Administrators a convenient way to view all resolved exceptions. Note the following:

- If an exception was deleted it would appear in the Resolved Exceptions worklist with Resolved to Acc# set to **Deleted**.
- If the exam that points to Resolved to Acc# was later deleted or detached, a message will displays stating that the exam could not be opened.

10.8.1 Viewing Resolved Exceptions

You can use the **Resolved Exceptions** worklist to quickly find resolved exceptions based on a combination of search criteria. You can search for exceptions using any combination of the following criteria. The search criteria in bold below must be displayed at all times:

- Organization
- Body Part
- **MRN**
- **Name**
- **Accession Number**
- Sex
- DOB
- Study Date/Time
- **Exception Date/Time**
- # Images

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- **Modality**
- Performing Resource
- Reason
- Department Name
- AE Title Name
- Study Description
- Station Name
- **Resolved By**
- **Resolved To ACC**
- **Resolved Date/Time**
- **Resolved Organization**

1. Select **Resolved Exceptions** from the Folder List (or the Shortcut Bar list if you have created a shortcut for this feature).
2. Enter the desired search criteria.You can use wildcard searches using patient name, MRN, or Accession # in the **Resolved Exceptions** worklist (for example, an MRN of 1234 returns matching MRNs 123456 and 123498). To search for resolved exceptions from all dates, select the **Exception Date/ Time** value and press the Delete key.
3. Click **Search**. A list of resolved exceptions that match your search criteria is displayed. The upper-right corner of the **Resolved Exceptions** worklist also displays the total number of resolved exceptions found. You can do the following:
   - Rearrange, re-size, and select certain search criteria columns to hide or display.
   - **Shift-click** to select contiguous exceptions or **Ctrl-click** to select multiple, non-contiguous exceptions.
4. If desired, open the exam to which the exception was resolved to view the study/images and verify resolution.

   Note the following:
   - A message displays if the exam has been deleted.
   - A message displays if the exam does not contain any images, if the study is detached, or if the user does not have rights to view the images.

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- If you double-click on a resolved exception that points to a deleted exception, no exam is opened and no message is displayed.

10.8.2 Exporting Resolved Exceptions

You can export the **Resolved Exceptions** worklist as a comma-separated data file (CSV format). The worklist is exported as a text list, including the data in the columns as they are displayed in IntelliSpace PACS.

1. Configure the **Resolved Exceptions** worklist to view the exceptions you wish to export.
2. Click **Export**.
3. From the **Save As** dialog box, navigate to the folder to which you want to export the CSV file.
4. Click **Save**.

10.8.3 Creating a Filter for Resolved Exceptions

You can create User or System filters for Resolved Exceptions. See 'Creating Filters' (see page 158).

10.9 Deleting Exception Studies

You may occasionally need to delete exception studies, such as those for phantom studies that you can't resolve with confidence. You can do this only if you have been assigned the proper permissions. Deleting an exception study removes it from the **Exceptions Handler** and any worklist that shows exceptions. Note that images associated with exception studies you delete cannot be linked with data from IntelliSpace PACS.

WARNING

- ***Deleting an exception study is a potentially hazardous operation, and cannot be undone and images cannot be recovered. You should review the Warnings in this chapter to ensure that you understand the possible ramifications of deleting an exception study.***

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- ***Make sure that you understand that when you detach DICOM studies from an exam and delete the subsequent exception, you are, in fact, permanently deleting those studies. Deleted studies may contain data that would render a different diagnosis.***

1. Use the **Exception Lookup** to search for exception studies.
2. Select an exception and right-click. From the menu, select **Delete Exception**. A message displays asking you to confirm the action.
3. Click **OK**. The study is deleted from the system and removed from the exceptions list. If IntelliSpace PACS receives the same images again from the modality, the study is not rejected or ignored, but instead treated as if it was being received for the first time.

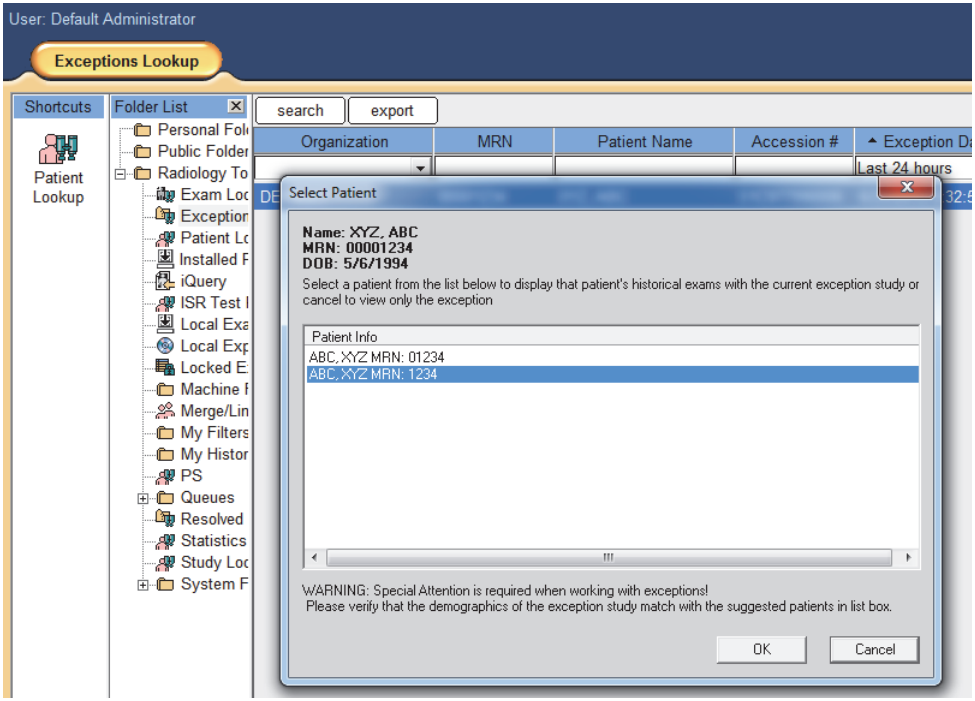
10.10 Soft Merge for Quick Review of Exceptions

When a physician opens an exception for a quick review before the exception is resolved to an exam, IntelliSpace PACS uses the MRN of the exception to query the database for any possible matches of the exception to existing patient exams.

If a single matching record is found with a matching patient first and last name, IntelliSpace PACS automatically displays the patient's historical images as part of the patient's timeline. However, the merged exam's study summary dialog has a gray background and displays "Warning: Some existing studies with same Name/Identifier are displayed along with exception study" as shown.

If more than one matching records are found, the Select Patient window displays a list of all matching patient records.

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10.11 Creating a New Patient and Exam from the Exceptions Handler

If you cannot find a patient in the database to match the exception to, you can create both a patient and an exam to resolve the exception study.

NOTE ***Refer to your local policy on creating new exams in IntelliSpace PACS before using the Create Patient and Exam feature. If you have HIS/RIS integration, patients and exams created in IntelliSpace PACS will not be synchronized in your HIS/RIS.***

1. Use the **Exception Lookup** to search for exception studies.
2. Select an exception and right-click. From the menu, select **Resolve Exception**. The **Exceptions Handler** displays.

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3. Review the top part of the **Exceptions Handler** to see the images of the exception study with the associated data fields. Suspect data fields are highlighted.
4. Review the bottom part of the **Exceptions Handler**. Click the **+** sign to expand the potential match list. This allows you to change column headers and/or change search criteria, and search again for potential matches. Double-click on any item in a potential match to view the images associated with it. This displays a new tab in the bottom pane that displays the images, allowing you to compare the images in the top and bottom part of the **Exceptions Handler**. The **Accession #**, **MRN**, **Patient Name**, **Modality**, **Exam Date/Time**, **Exam Code**, and **Organization** are displayed for the images.
5. If you cannot find a patient or exam to associate with the study, click **Create Patient and Exam**. The **Create Patient and Exam** dialog box displays with the **Patient Info** pane displayed. The patient must have exams to use this feature.
6. Select the **Organization** from the list.
7. Enter the **MRN** number and information on the patient.
8. Click **Exam Info**. The Organization you selected in the **Patient Info** pane is displayed and cannot be changed.
9. Enter the exam information.
10. When you are done, click **Save**. You return to the **Exceptions Handler**.
11. Click **Resolve**. A message displays asking you to confirm the action.
12. Click **OK**. The exception is resolved.

10.12 Creating a New Exam from the Exceptions Handler

If you can find a patient, but cannot find an exam to resolve the exception, you can create an exam for the exception study from the **Exceptions Handler**. For example, in a trauma case, the images would be exceptions if

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the patient name was unknown and the exams were done in the Emergency Room. Later, you could search for the patient in the database. If the patient name is in the database, you can create an exam for the exception study.

NOTE ***Refer to your local policy on creating new exam in IntelliSpace PACS before using the Create Exam feature. If you have HIS/RIS integration, exams created in IntelliSpace PACS will not be synchronized in your HIS/RIS.***

1. Use the **Exception Lookup** to search for exception studies.
2. Select an exception and right-click. From the menu, select **Resolve Exception**. The **Exceptions Handler** displays.
3. Review the top part of the **Exceptions Handler** to see the images of the exception study with the associated data fields. Suspect data fields are highlighted.
4. Review the bottom part of the **Exceptions Handler**. Click the **+** sign to expand the potential match list. This allows you to change search criteria and search again for potential matches.
5. Double-click on any item in a potential match to view the images associated with it. This displays a new tab in the bottom pane that displays the images, allowing you to compare the images in the top and bottom part of the **Exceptions Handler**. The **Accession #**, **MRN**, **Patient Name**, **Modality**, **Exam Date/Time**, **Exam Code**, and **Organization** are displayed for the images.
6. If you can find a patient, but not an exam, click **Create Exam**. The **Create Exam** dialog box displays with the **Exam Info** pane displayed.
7. From the **Exam Priority** list, select the priority of the exam.
8. Enter the **Accession #** for the exam. This field is mandatory.
9. Enter the **Scheduled Date**. Click the arrow to display a calendar control.
10. Enter the **Exam Code**, or click the button to search for and select an exam code from the **Exam Code Dictionary**.
11. Enter the **Exam Code Modifier**, or click the button to search for and select one from the **Exam Code Modifier Dictionary**.

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12. Enter the **Performing Resource** or click the button to search for and select one from the **Performing Resource Dictionary**.
13. Enter the **Ordering Location** for the exam, or click the button to search for and select one from the **Ordering Location Dictionary**.
14. If desired, enter information in the **Providers** and **Exam History** panes. See 'Entering Provider Information When Creating Exams' (see page 192) or 'Entering Exam History Information When Creating Exams' (see page 192).
15. When you are done, click **Save**. You return to the **Exceptions Handler**.
16. Click **Resolve**. A message displays asking you to confirm the action.
17. Click **OK**. The exception is resolved.

10.12.1 Entering Provider Information When Creating Exams

1. In the **Create Exam** dialog box, click **Providers**.
2. Enter the name of the **Referring Physician**, or click the button to search for and select a referring physician from the **Providers Dictionary**. When you select a provider, the available contact and address information is displayed.
3. Click **Exam History** if you want to enter exam history information.
4. When you are done, click **Save**. You return to the **Exceptions Handler**.
5. Click **Resolve**. A message displays asking you to confirm the action.
6. Click **OK**. The exception is resolved.

10.12.2 Entering Exam History Information When Creating Exams

1. In the **Create Exam** dialog box, click **Exam History**.
2. Enter information on the **Signs and Symptoms** for the exam.
3. Enter information about the **History** for the exam.
4. Enter additional **Comments** about the exam.
5. When you are done, click **Save**. You return to the **Exceptions Handler**.
6. Click **Resolve**. A message displays asking you to confirm the action.

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7. Click **OK**. The exception is resolved.

10.13 Hiding and Closing the Clinical Info Dialog

You can change to a different tab or close the Exception Handler dialog, in which case the exam will not be displayed anymore.

When the exam associated with the currently opened Clinical Info becomes invisible, the Clinical Info dialog is hidden. The Clinical Info dialog becomes visible again when you switch back to the same exam display.

When you close the Exception Handler dialog, the Clinical Info dialog is closed as well.

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11 Using the Canvas Page

11.1 Introduction to the Canvas Page

The Canvas Page displays patient exams and provides quick access to diagnostic images and series, diagnostic reports and exam notes, patient information, and diagnostic reading workflow. You use the Canvas Page to get contextual, historical information about the patient.

You can reposition an image by selecting its information bar, dragging and dropping it to the desired location. Each exam has its own horizontal scrollbar that you can use to pan through the images and series in that exam. You can use the vertical scrollbar at the right side of the screen to view the selected exams if there are more than can fit on the screen.

WARNING

- ***Make sure you label the left and right sides of an image correctly to prevent incorrect patient orientation and the possibility of misdiagnosis.***
- ***Make sure you follow industry best practices for correct patient orientation.***
- ***Make sure the images were acquired correctly at the modality before using them for diagnosis.***
- ***Make sure you validate third party software to ensure that it is using the correct information from the outside source. In addition, proper validation of third party software must be done to ensure that it is using standard DICOM tags. Images that are submitted with a different pixel spacing tag than what IntelliSpace PACS uses (0018,1164) to perform measurements on projection radiography images could lead to incorrect measurement readings, thus leading to misdiagnosis and treatment planning.***

The IntelliSpace Enterprise Canvas Page displays the following:

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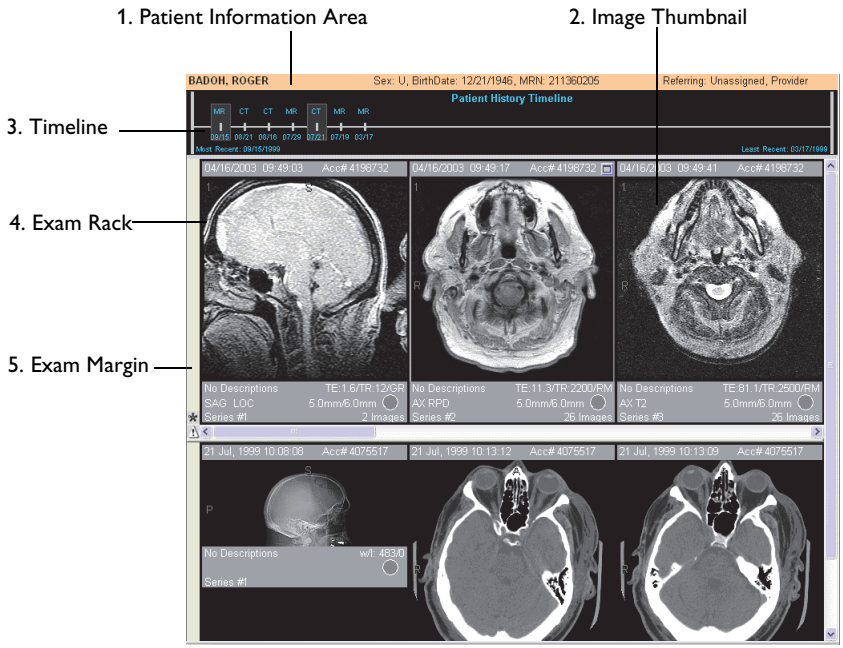


Figure 11.1 IntelliSpace PACS Enterprise Canvas Page

1. Patient Information Area: Displays general information about the patient whose exams you are viewing, including the patient's name, sex, date of birth, MRN, and referring physician. It also displays a Patient Class entry, which designates the type of patient, typically Inpatient (I), Outpatient (O), Emergency (E), and so forth. This information comes from the HIS/RIS.

2. Image Thumbnail: Displays thumbnail images and/or image series of an exam. Each image or series has an information bar below it. Double-clicking a thumbnail image or series opens an image popup window. Right-clicking a thumbnail image displays a menu with various options. See 'Using Image Popup Windows' (see page 209) and 'Using Thumbnail Images' (see page 206).

3. Patient History Timeline: Displays a chronological listing of all of the patient's exams on the IntelliSpace PACS server. See 'Using the Patient History Timeline' (see page 197).

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4. Exam Rack: A horizontal or vertical display of the thumbnail images for the exam.

5. Exam Margin: Displays various icons if they are available for the image. Right-clicking in the Exam Margin displays a menu with various options. See 'Using the Exam Margin' (see page 204).

11.2 Using the Patient History Timeline

The **Patient History Timeline** is a fast and intuitive way to view and navigate through a patient's clinical history of diagnostic exams and reports. Exams on the IntelliSpace PACS server are listed chronologically, with the most recent exam dates displayed on the left and the older exam dates displayed on the right.

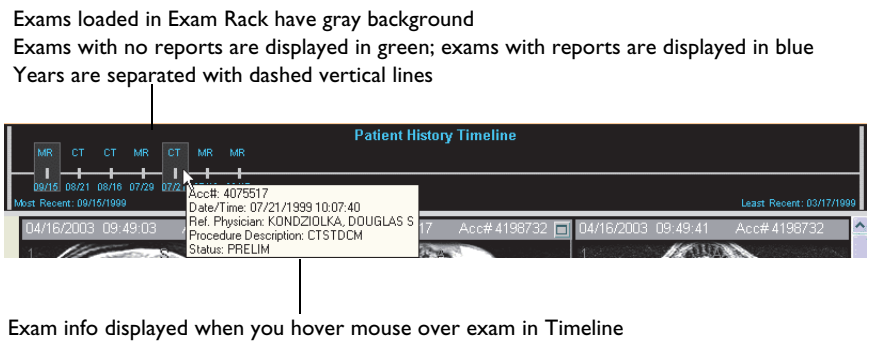

Exams loaded in Exam Rack have gray background
Exams with no reports are displayed in green; exams with reports are displayed in blue
Years are separated with dashed vertical lines
Patient History Timeline
MR CT CT MR CT MR MR
09/15 08/21 08/16 07/29
Most Recent: 09/15/1999
Least Recent: 03/17/1999
Acc#: 4075517
Date/Time: 07/21/1999 10:07:40
Ref. Physician: KONDZIOLKA, DOUGLAS S
Procedure Description: CTSTDCM
Status: PRELIM
04/16/2003 09:49:03
Acc# 4198732
04/16/2003 09:49:41
Acc# 4198732
Exam info displayed when you hover mouse over exam in Timeline

Figure 11.2 IntelliSpace PACS Enterprise Patient History Timeline

For each exam, there is an icon (small square box) displayed in the timeline that displays, from top to bottom:

- Modality type
- First four characters of the body part (from the dictionary)
- Either a straight line, an "A" or an "X." A straight line indicates that there are images and the exam status is Scheduled, or the conditions for displaying an "A" have not been not met. An "A" indicates that the exam

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may exist on a separate archive. An “X" indicates that an exam exists but images are not available. Blue text indicates that a report should be available.

- Date (month/day)

If you click on an exam in the Patient History Timeline that displays an “X” and does not have a Scheduled status, the **iQuery** dialog box displays under the following conditions to initiate a DICOM query from another DICOM device:

- iQuery is configured
- You have the proper privileges to run iQuery
- There is at least one DICOM QRP Source configured.

Otherwise, the exam does not load and no action is performed when you click on the exam in the timeline.

Exams that are present in your institution's archive but are not loaded on the IntelliSpace PACS Server are displayed with an “**A**” under the following conditions:

- The exam date and time is older than 48 hours
- The system preference **Allow DICOM Query to Display in Timeline** is enabled
- iQuery has been configured with at least one DICOM QRP source
- The IntelliSpace PACS user has iQuery access privileges
- The exam has no images and the exam status is neither Scheduled nor Non-Reportable.

Left-clicking on an exam in the Patient History Timeline displays that exam in the Exam Rack. Right-clicking on an exam in the Patient History Timeline displays a menu with the following options, depending on the exam:

- **Open/Close Exam**: See ‘Opening or Closing an Exam’ (see page 203)
- **Add Exam to Folder**: See ‘Adding Exams to Folders’ (see page 55)

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- **Show Report**: See 'Displaying and Printing the Current Report' (see page 145)
- **View Exam Notes**: See 'Viewing Exam Notes' (see page 133)
- **Export via DICOM**: See 'iExport for DICOM Export' (see page 303)
- **Cache Exam**: See 'Local Exam Caching' (see page 123)

11.2.1 Federation and the Patient History Timeline

When viewing the Patient History Timeline, there are some differences when remote (Federation) exams are displayed.

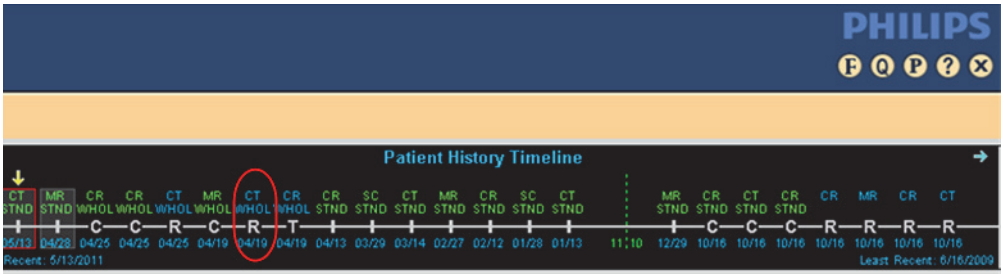


Figure 11.3 View of the Patient History Timeline with remote exams displayed

Remote exams are displayed on the timeline with an initial C, R, or T below the exam. These initials specify the state the exam is in as follows:

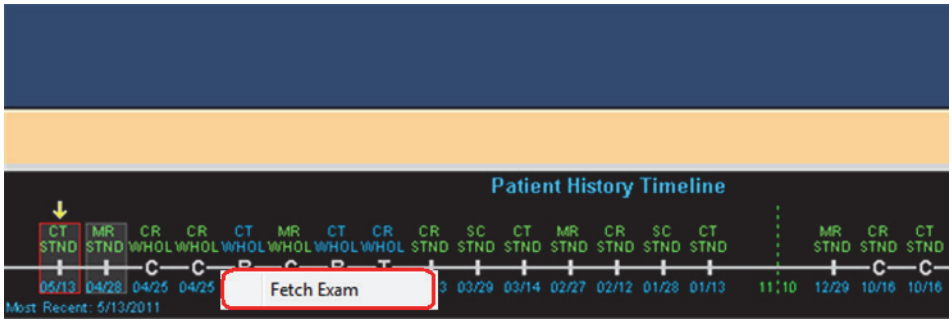
- **C:** the remote exam is already cached locally
- **R:** a remote exam has been identified in the federation
- **T:** exam is in the process of being transferred from the federation to the local cache

In addition, when the **F** icon in the Control Strip is amber (one or more remote locations missing), an **X** appears in the far right of the Patient History Timeline to indicate that the timeline may be incomplete because one or more remote locations are missing.

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If an exam is present local (either cached locally or in a local PACS), the modality and body part displays on the timeline as green, while remote exams that are either still remote or are in the process of transferring display as blue on the timeline.

If you right-click a remote exam (displaying the **R** marker) on the Patient History Timeline, Fetch Exams displays.



Click **Fetch Exams** and the transfer process for the remote exam begins, displaying the **T** marker in the timeline, as the exam is being transferred. Once the exam has transferred and has been cached locally (displays the **C** marker in the timeline), you can click the exam and open it in the Canvas Page.

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In addition, a new icon displays in the exam margin to show that the remote exam is cached, and the exam information text and background color is changed (dark blue and gray, respectively.

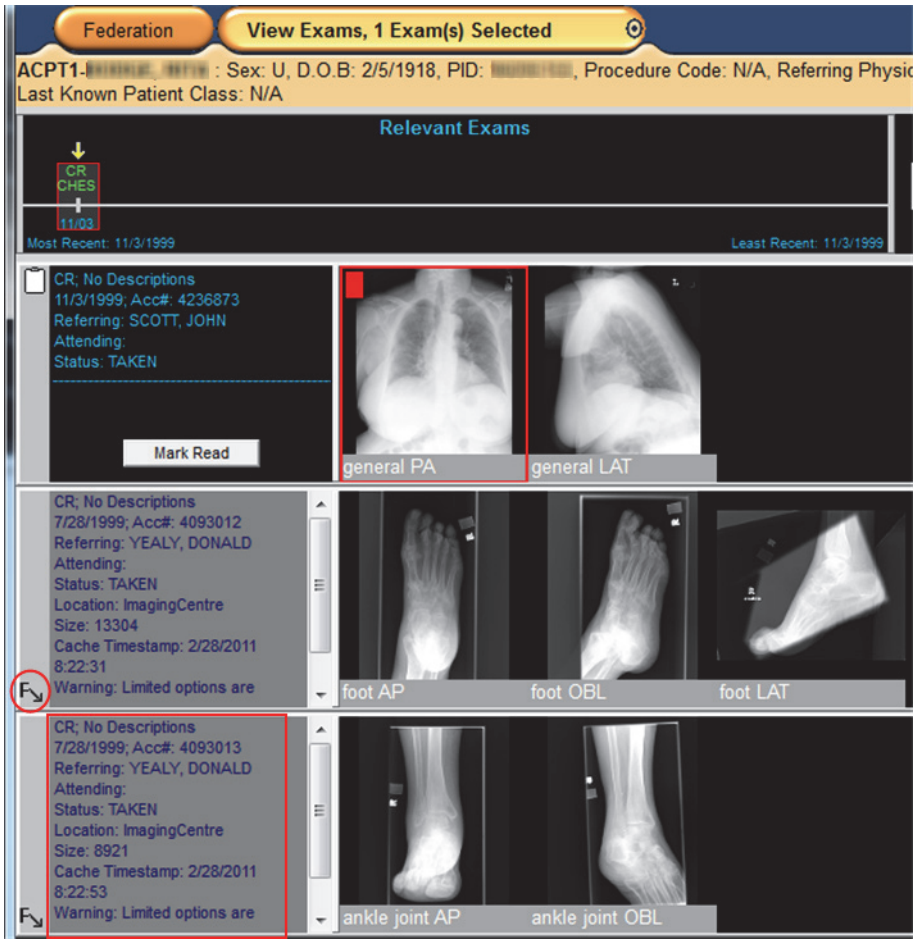
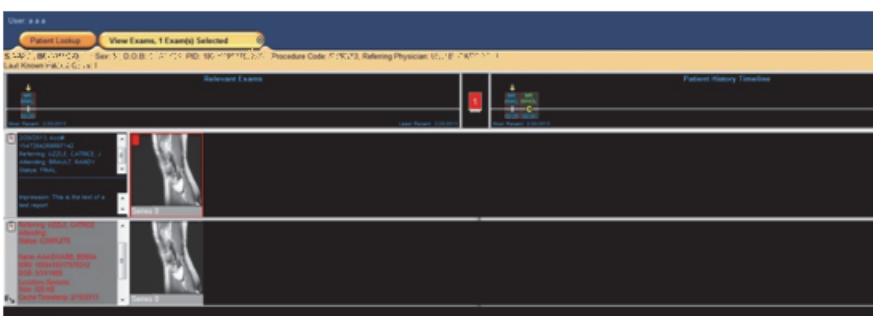


Figure 11.4 View of Exam Margin showing remote exam icon (circled) and the changed exam information text and background

Besides the different colors of the text and background, there are other changes for cached exams:

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- The exam information summary displays the name of the remote location; the size of the exam (in KB); the timestamp of the cached exam; attributes Patient Name, DOB, and MRN at the remote site; and also a warning, “Limited options are available for remote exams.
- You have limited access to the HL7 information displayed in the exam information summary.
- Cached exams can only be opened as a prior and not opened as a main exam, which means they cannot be marked read.
- You cannot view the Clinical Information dialog for cached exams, so you cannot view the Exam notes for a cached exam.
- Diagnostic reports for remote/cached exams show only the text of the report, and not the other tabs normally displayed in the Clinical Information dialog.
- You cannot create a conference presentation state for the main exam while the cached exam is open.
- Right-click options for a cached exam are limited. You can load an existing presentation state, but you cannot
  - create/edit/save a new presentation state
  - assign a new SUID
  - export DICOM
- If the local Patient demographics are different from the cached exam demographics, the text is displayed in red.



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- You can delete cached remote exams by right-clicking on the patient exam from the Worklist and selecting **Delete Exam** from the context menu.

11.3 Accessing Exams that are not on the IntelliSpace PACS Server

- Double-click an exam with an "**A**" in the timeline. IntelliSpace PACS queries the available archives to retrieve the exam in question. An empty exam rack loads in the Canvas Page while the exam is being retrieved. The **Modality**, **Accession Number**, **Referring Physician**, and **Status** are displayed, as well as an estimate of how much time remains before the exam is retrieved and a display of the images being requested. Click **Cancel** to stop the archive retrieval.

11.4 Opening or Closing an Exam

You can have up to 30 exams open at a time. If IntelliSpace PACS cannot open an exam because of low memory usage, a message is displayed indicating that the exam cannot be opened. Also, if an exam in a prior Exam Rack cannot open because of low memory, a memory error is displayed on the Exam Rack with a **Retry/Close** button. This allows you to either close the Exam Rack or try opening the prior again after closing some other exams to free some memory.

- Either left-click on an exam in the timeline, or right-click on an exam in the timeline and select **Open Exam** from the menu. If an exam is already loaded into the Exam Rack and you want to unload it, right-click on the exam in the timeline and from the menu, select **Close Exam**.

NOTE ***If an exam cannot open because of low memory and no other exams are open, an unexpected low memory error is displayed. It is highly recommended that after you click OK to close the message, you should restart the IntelliSpace PACS client. The results of future actions will be unpredictable and crashes may occur if the client is not restarted.***

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11.5 Ordering of Images in the Exam Rack

Note how the following conditions affect how images are ordered in the Exam Rack:

- When an exam is opened from the worklist and there is a presentation state that will be loaded, the order of the images on the Exam Rack is based on the order defined by the presentation state.

11.6 Using the Exam Margin

The Exam Margin displays icons relevant to the exam, such as a **Report** icon if there is a diagnostic report for the exam. In addition, an icon now displays in the Exam Margin when new images have been added to a study loaded onto that Exam Rack. Hovering over the icon displays the tooltip "New images or other DICOM was received for this exam and has been loaded."

Icons in the Exam Margin indicate the following:

Icon	Description
	A diagnostic report is available
	An exam note is available
	A critical exam note is available
	Not all images for this exam may be available. Also displayed if new images are received by IntelliSpace PACS after a Mark Read presentation state has been created.
	New images have arrived. This icon is not displayed for exams that have been marked Read.

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Icon	Description
	This study has been cached from a remote site
	A presentation state has been loaded
	Add a comment for an anonymous exam (similar to an exam note). This icon displays only if the anonymized exam is opened from an anonymized personal folder.
	Indicates that the GSPS has loaded successfully.
	Indicates that the GSPS has not loaded successfully.
	Indicates that the studies contain a SOP instance that cannot be displayed. See the *IntelliSpace PACS DICOM Conformance Statement* for information on the SOP classes that are for storage only (no display) and those that are for storage and display.

Right-clicking in the Exam Margin displays a menu with the following options:

- **Presentation States**: See 'Using Presentation States' (see page 216)
- **Recover Deleted Image(s)**: See 'Recovering Deleted Images' (see page 331)
- **Minimizing Images**: See 'Minimizing Images' (see page 254)
- **Add Exam to Folder**: See 'Adding Exams to Folders' (see page 55)
- **Exam Information**: See 'Displaying Exam Information' (see page 206)
- **Export via DICOM**: See 'iExport for DICOM Export' (see page 303)
- **Horizontal/Vertical Rack**: See 'Configuring Horizontal or Vertical Racks' (see page 206)
- **Exam View**: See 'Philips IntelliSpace Clinical Applications' (see page 283)

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11.7 Resizing an Exam Rack Height

There are two heights available for Exam Racks: small and normal.

1. Place the cursor on the bottom border of the Exam Rack you want to resize. The normal pointer changes to a resize pointer.
2. Click and drag the pointer to change the height of the Exam Rack. When you double the height of a normal Exam Rack, IntelliSpace PACS automatically changes the size of the images and series in that Exam Rack. You can also resize normal-sized Exam Racks by right-clicking in the Exam Margin and selecting **Minimize Images**.

11.8 Configuring Horizontal or Vertical Racks

You set whether Exam Racks are initially displayed horizontally or vertically in the User preferences. See 'Setting General Preferences' (see page 338).

- Right-click in the Exam Margin and from the menu, select **Horizontal Rack** or **Vertical Rack**.

11.9 Displaying Exam Information

1. Right-click in the Exam Margin and from the menu, select **Exam Information**. The **Exam Information** dialog box displays and displays HIS/RIS and DICOM metadata about the selected exam.
2. Review the information and click **OK**. You return to the Canvas Page.

11.10 Using Thumbnail Images

Thumbnail images are the small images displayed in the Exam Rack. You can double-click a thumbnail image to display it in an image popup window. You can also right-click a thumbnail image and select **Create Popup** from the menu. See 'Using Image Popup Windows' (see page 209).

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Right-clicking on a thumbnail image displays a menu with the following options, depending on the modality and whether the series is single-image or multi-sliced.

- **Interaction**: Allows you to select an enhanced cursor for zoom, pan, scroll, or brightness, if you have enabled this in the General user preferences. See 'Setting General Preferences' (see page 338) and 'Enhanced Mouse Scheme' (see page 403)
- **Window Width and Level (WW/WL)**: See 'Setting the Window Width/ Level' (see page 231)
- **Image Processing**: See 'Image Processing' (see page 236)
- **Scout Line Mode** (for CT, MR, PT): See 'Using the Scout Tool' (see page 244)
- **Localizer Mode** (for CT, MR, PT): See 'Using the Localizer Tool' (see page 245)
- **Create Popup**: Displays the image in a separate window.
- **Key Image**: See 'Using Key Images' (see page 221)
- **Measurements**: See 'Using the Measurement Palette' (see page 263)
- **Annotations**: 'Annotating Images' (see page 277)
- **Delete All Measurements and Annotations**: 'Using the Measurement Palette' (see page 263)
- **VOI LUT** (for CR, DX, and MG): See 'Value of Interest LUT (VOI LUT)' (see page 234)
- **Clone**: See 'Using Clone Windows' (see page 211)
- **Remove Clone**: See'Removing Clones' (see page 211)
- **Zoom Presets**: Allows you to select a preset zoom factor of **Fit to Window**, **100% (Original Size)**, **200%**, **300%**, or **400%**.
- **Export**: Allows you to select **Export via DICOM**, **Export Image via DICOM**, or **Anonymous Export via DICOM**. See 'iExport for DICOM Export' (see page 303)
- **Clone Window with Preset**: See 'Using Clone Windows' (see page 211)

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- **Play Cine Loop** (for multi-sliced series): Allows you to scroll through the slices in a series either one-by-one (Cine mode) or rapidly (Fast Cine). For a frame-by-frame review, slowly scroll the mouse-wheel. For rapid review, double-click the mouse-wheel and drag the mouse forward or backward. For **Coarse Fast Cine** mode in **Standard** mouse mode, click the middle mouse button while dragging the mouse up or down past the point in which you placed your cursor. In **Enhanced** mouse mode, left-click while dragging the mouse down past the point in which you placed your cursor.
- **New Link**: See 'Linking Image Series' (see page 224)
- **Link All Axials/Sagittals/Coronals/Obliques** (for multi-sliced series): 'Linking Image Series' (see page 224)
- **Join Link** (if link type exists): Joins series to the existing link.
- **Leave Link** (if series is linked): Removes the series from the link.
- **Link Selected Images**: Links selected windows that are of the same type.
- **Unlink All**: See 'Unlinking Images' (see page 226)
- **Activate/Deactivate Link**: See 'Activating and Deactivating Links' (see page 226)
- **Save**: Saves the image.



WARNING ***Use caution when saving an image to the clipboard and copying it to another application. The image may contain confidential patient information.***

- **Paper**: See 'Printing to Paper' (see page 302)
- **Flip/Rotate/Sort/Split**: See 'Flipping an Image' (see page 255)
- **Delete**: See 'Deleting Studies and Images' (see page 329)
- **Assign New Unique Study UID**: See 'Manually Assigning New Unique Study Instance UIDs' (see page 324)
- **Detach Study from Exam** (for exams having two or more studies): See 'Detaching Individual Studies from Exams' (see page 211)

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11.11 Using Image Popup Windows

Image popup windows provide additional image manipulation functionality not available for thumbnail images. You can arrange these windows by dragging them to the desired location on the Canvas Page and resizing them.

You can display an image popup window by doing one of the following:

- Double-clicking a thumbnail image
- Right-clicking an image and selecting **Create Popup** from the menu.

You can minimize popup windows by double-clicking on the window's top margin. To re-enlarge the window, double-click the image margin.

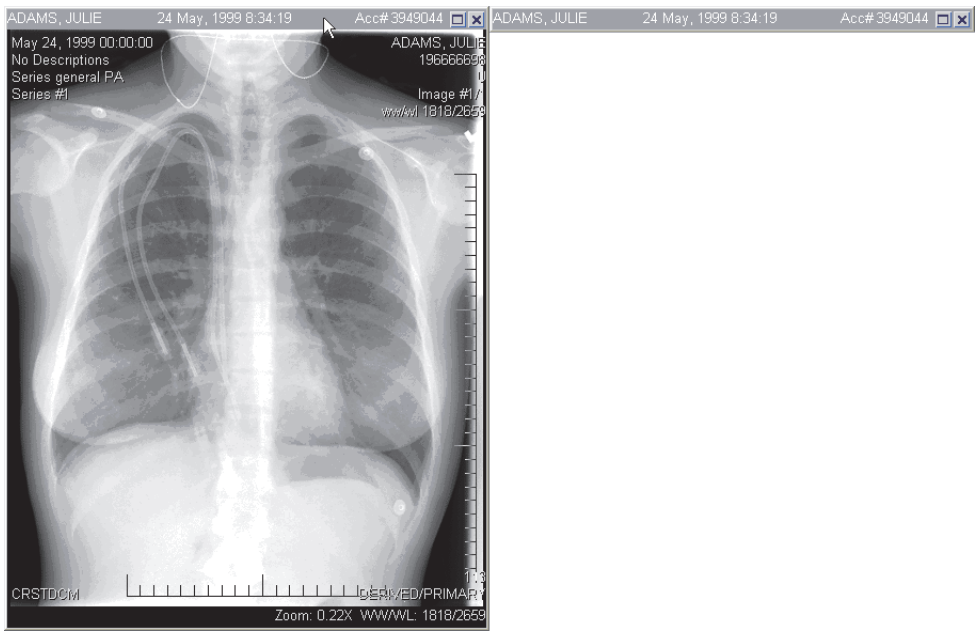


Figure 11.5 Window Shades

Right-clicking in an image popup window displays a menu with the following options, depending on the modality and whether the series is single-image or multi-sliced:

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- **Interaction**: Allows you to select an enhanced cursor for zoom, pan, scroll, or brightness, if you have enabled this in the General user preferences. See 'Setting General Preferences' (see page 338) and 'Enhanced Mouse Scheme' (see page 403)
- **Window Width/Level (WW/WL)**: See 'Setting the Window Width/Level' (see page 231).
- **Measurements**: See 'Using the Measurement Palette' (see page 263)
- **Annotations**: See 'Annotating Images' (see page 277)
- **Delete All Measurements and Annotations** (if there are annotations): See 'Clearing Measurements and Annotations' (see page 264)
- **Image Processing**: See 'Image Processing' (see page 236)
- **Scout Line Mode** (for CT, MR, and PT): See 'Using the Scout Tool' (see page 244)
- **Localizer Mode** (for CT, MR, and PT): See 'Using the Localizer Tool' (see page 245)
- **Multi-Image Mode** (for stack images): Allows you to split a series window so that multiple slices can be displayed in a single image window.
- **Key Image**: See 'Using Key Images' (see page 221)
- **Play Cine Loop** (for multi-sliced series): Allows you to scroll through the slices in a series either one-by-one (Cine mode) or rapidly (Fast Cine). For a frame-by-frame review, slowly scroll the mouse-wheel. For rapid review, double-click the mouse-wheel and drag the mouse forward or backward. For **Coarse Fast Cine** mode in **Standard** mouse mode, click the middle mouse button while dragging the mouse up or down past the point in which you placed your cursor. In **Enhanced** mouse mode, left-click while dragging the mouse down past the point in which you placed your cursor.
- **New Link**: See 'Linking Image Series' (see page 224)
- **Link All Axials/Sagittals/Coronals/Obliques** (for multi-sliced series): 'Linking Image Series' (see page 224)
- **Clone**: See 'Using Clone Windows' (see page 211)
- **Clone Window with Preset**: 'Using Clone Windows' (see page 211)

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- **Save**: Saves the image.
- **To Paper Printer**: See 'Printing to Paper' (see page 302)
- **Flip/Rotate/Sort/Split**: See 'Flipping an Image' (see page 255)
- **Zoom Presets**: Allows you to select a preset zoom factor of **Fit to Window**, **100% (Original Size)**, **200%**, **300%**, or **400%**.
- **Magnifying Glass**: See 'Using the Magnifying Glass Tool' (see page 249)

11.12 Using Clone Windows

Clones are copies of images or series that provide alternate image processing, and enable you to apply different filters and Window Width and Levels. When you create a clone, it is displayed as a thumbnail image in the Exam Rack on the Canvas Page. You can double-click a cloned thumbnail to display it in a large image popup window for better resolution.

You can use clones to clone all single image windows and apply the **Invert Image** feature to the clone(s) or to clone all stacked image windows with a Lung or Bone Window Width and Level Preset.

Cloned images in the Exam Rack are marked with a "C" and a sequential number (C1, C2, and so on).

- In the Exam Rack, right-click the image you want to clone. From the menu, select **Clone**.
- Double-click the cloned image to open it in an image popup window.

11.12.1 Removing Clones

- Right-click a cloned image and select **Remove Clone** from the menu.

11.13 Detaching Individual Studies from Exams

Sometimes a study gets associated with the wrong exam. In this case, you don't want to detach both studies from an exam, just the one that should be associated with another exam. If you have the proper privileges, you can detach individual DICOM studies from an exam for a thumbnail image on

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the Canvas Page, as long as the selected thumbnail window is not a Clone or Key Image window. Detached studies will become exceptions and should be resolved to the correct exam.

NOTE ***When a study is detached from an exam, IntelliSpace PACS may not be able to determine whether that study was used to set the exam fields. Therefore, when an exam gets created with no modality type and body part, the following might occur:***

- ***Study1 arrives and is wrongly attached to the exam. The modality and body part of study1 is copied into the exam.***
- ***When Study 2 arrives for the exam (correctly), its modality and body part are ignored (because the exam already has them set).***
- ***When you detach Study1 from the exam, IntelliSpace PACS shows the wrong modality and body part for the exam.***

To correct this problem, manually edit the exam and select an exam code that is associated with the correct modality and body part.

1. Right-click on the thumbnail image and from the menu, select **Detach Study from Exam**. The **Detach Study from Exam** dialog box displays. The **Reason** field is populated from the **Reason** dictionary.
2. Review the **Study Description** area to see the original DICOM metadata for the following:
   - Patient Name
   - Accession Number
   - Date of Birth
   - Sex
   - MRN
   - Study Date
3. Review the **Series/Images** area tree control to see the following information:
   - Study UID of the selected DICOM study
   - Total Number of images associated with the selected DICOM study
   - Series UID(s) of all the series associated with the selected DICOM study

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- Image UID(s) of all the images associated with the selected DICOM study

4. Enter the reason you want to detach the study, or select a **Reason** from the list.
5. Click **OK**. A message displays while the study is being detached from the exam.

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12 Viewing and Manipulating Images

IntelliSpace PACS includes the following features you can use to view and manipulate images:

- **Presentation States**: See 'Using Presentation States' (see page 216)
- **Key Images**: See 'Using Key Images' (see page 221)
- **Linking Image Series**: See 'Linking Image Series' (see page 224)
- **Window Width/Level**: See 'Setting the Window Width/Level' (see page 231)
- **VOI LUT**: See 'Value of Interest LUT (VOI LUT)' (see page 234)
- **Edge Enhance**: See 'Enhancing the Edges of an Image' (see page 239)
- **Edge Detect**: See 'Detecting the Edges of an Image' (see page 240)
- **Median Filter**: See 'Filtering the Image' (see page 241)
- **Histogram**: See 'Using Contrast Limited Adaptive Histogram Equalization' (see page 242)
- **Scout Mode**: See 'Using the Scout Tool' (see page 244)
- **Localizer Tool**: See 'Using the Localizer Tool' (see page 245)
- **Zooming**: See 'Zoom Presets' (see page 247)
- **Magnifying Glass**: See 'Using the Magnifying Glass Tool' (see page 249)
- **Step Zoom**: See 'Using the Step Zoom Tool' (see page 251)
- **Panning**: See 'Panning Around an Image' (see page 254)
- **Minimizing Images**: See 'Minimizing Images' (see page 254)
- **Interpolation**: See 'Selecting an Interpolation Scheme' (see page 243)
- **Flip**: See 'Flipping an Image' (see page 255)
- **Rotate**: See 'Rotating an Image' (see page 255)
- **Sort**: See 'Sorting Images' (see page 255)
- **Split**: See 'Splitting Exams' (see page 256)

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- **Shutter effects**: See 'Viewing Shutter Images' (see page 256)

12.1 Using Presentation States

A presentation state allows you to save the state of the exam as last viewed. This may include annotations and measurements or the way the exam is laid out. For example, if you open an exam, cine to particular slices in a series and adjust the Window Width and Level values, then save the presentation state, this configuration of the exam is preserved. Some features, such as the location of **Scout Lines** and the **Localizer Tool** are not preserved in presentation states.

You can create a new presentation state or load a pre-configured presentation state created by a user or Technologist. When an exam presentation state is displayed, the Presentation State icon is displayed in the exam margin.

The initial presentation state of an exam depends on which presentation states are available. The following types of presentation states are available:

- Original DICOM
- Technologist
- Pre-read
- User

These types are weighted. For example, if no presentation states have been created, the initial presentation state is the Original DICOM state. If a Technologist has created a presentation state, that will be presented first instead of the Original DICOM. If a Radiologist has created a presentation state, that will be presented first instead of the Technologist's presentation state.

Note the following:

- DICOM grayscale presentation state studies are supported. See 'DICOM Grayscale Softcopy Presentation States (GSPS)' (see page 218).

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- If additional images have been added to the exam since the default presentation was last saved, the exam will open using the Original DICOM presentation state, and a message will display alerting you that additional images have been added to the exam.
- Native iSyntax presentation states not in GSPS are not exported.

12.1.1 Saving a Presentation State

1. Open and make the desired adjustments to the exam.
2. Right-click the Exam Margin and from the menu, select **Presentation State**, then **Save Presentation State**. The **Save Presentation State** dialog box displays.
3. Enter a name for the presentation state.
4. Select one of the following types for the presentation state:
   - **Technologist**: Select this type if you are a Technologist who is configuring the exam to be reviewed by a Radiologist.
   - **Pre-read**: Select this type if you are a Radiologist who is performing a preliminary review of an exam via IntelliSpace PACS, possibly doing measurements remotely from home. When you create the final diagnostic report, the exam will contain the preliminary measurements.
   - **User**: Select this type if you are creating presentation states for your own personal use as these presentation states are only visible by you.
5. Click **OK**. The presentation state is saved and listed with the other presentation states. The list includes the name of the presentation state, the user name, and the date and time the presentation state was created.

12.1.2 Selecting a Presentation State

1. Open an exam.
2. Right-click the exam margin and from the menu, select **Presentation State**, then select the desired presentation state.

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12.1.3 DICOM Grayscale Softcopy Presentation States (GSPS)

DICOM Grayscale Softcopy Presentation State (GSPS) studies are supported. IntelliSpace PACS supports the loading and display of GSPS annotations when associated with an MG image.

IntelliSpace PACS can display annotations (unformatted text value with or without anchor point, poly-line, circle, and ellipse) from any third-party vendor's GSPS. It is important to note that flipped images or point and interpolated annotations in GSPS will not display in IntelliSpace PACS. Only the aforementioned annotations are supported for display at this time. The GSPS annotations are read-only and cannot be modified or saved. An "AS LAST SEEN" GSPS denotes that it came from a dedicated Volume Vision workstation. IntelliSpace PACS Administrators with administrative privileges can delete GSPSs to prevent users from viewing them in IntelliSpace PACS. However, this is treated like the Delete function in which images can be recovered.

WARNING

- ***GSPS may contain clinically relevant data (such as measurements), which may display incorrectly or not at all. This could cause a misdiagnosis or a delay in treatment.***
- ***If an error is discovered within the GSPS, a warning icon displays that indicates all GSPS content may not be displayed.***
- ***When multiple third-party GSPS are received, IntelliSpace PACS displays the most recent one first, because no priority information is available. This may mean that other Presentation States are not displayed by default, so the chronology may be affected, possibly leading to misdiagnosis.***

The following table lists the modules supported for display of GSPS objects. When IntelliSpace PACS receives GSPS from a non-IntelliSpace PACS source, these are the supported modules.

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Module	Supported?	Note
Presentation State Identification	Yes	
Presentation State Relationship	Yes (partial)	
Presentation State Shutter	No	
Presentation State Mask	No	
Mask	No	
Display Shutter	Yes (partial)	
Bitmap Display Shutter	No	
Overlay Plane	Yes (partial)	
Overlay Activation	Yes	
Displayed Area	No	
Graphic Annotation	Yes (partial)	
Spatial Transformation	Yes	
Graphic Layer	Yes	
Modality LUT	Yes (partial)	
Softcopy VOI LUT	Yes	Only direct WW/WL is supported
Softcopy Presentation LUT	Yes	For example, Invert
SOP Common	Yes (partial)	

When IntelliSpace PACS exports GSPS to a non-IntelliSpace PACS source, these are the supported modules:

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Module	Supported?
Presentation State Identification	Yes
Presentation State Relationship	Yes (partial)
Presentation State Shutter	Yes
Presentation State Mask	No
Mask	No
Display Shutter	No
Bitmap Display Shutter	No
Overlay Plane	Yes (partial)
Overlay Activation	Yes
Displayed Area	Yes (partial)
Graphic Annotation	Yes (partial)
Spatial Transformation	Yes
Graphic Layer	Yes
Modality LUT	Yes (partial)
Softcopy VOI LUT	Yes (partial)
Softcopy Presentation LUT	Yes (partial)
SOP Common	Yes (partial)

When a GSPS is available for a study, the GSPS label is added to the Presentation State menu. Note the following:

- The GSPS automatically loads only when there is no Radiologist, Dictation, or Technologist presentation state. These presentation states take precedence over GSPS.
- If IntelliSpace PACS cannot support annotations in a GSPS, the GSPS will not be loaded and an audit message will be created.
- You can create new annotations on top of GSPS annotations, and save newly created annotation in an IntelliSpace PACS presentation state.

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- You cannot edit or delete annotations loaded from a GSPS, because they are read only. (This also applies if the annotations loaded from a GSPS are saved in an IntelliSpace PACS presentation state.)

WARNING

An image artifact may appear when a Modality LUT or a mask is applied to a sub-sampled image. The sub-sampled image means that the image data is not fully retrieved from the server and, therefore, not displaying at full resolution. Diagnosis should only occur on images that are displayed at full (100%) resolution. If images are displayed at full resolution, no artifact should appear.

12.2 Using Key Images

Key images are images you mark as "key." They are archived and displayed as a component of presentation states and can be marked as key for a variety of reasons, including improving referring physician access by providing a way to focus on the most pertinent images in a study, for teaching files, consultation, and image quality issues.

Key images are identified by the text message "Key" at the lower-left corner of the image. When a measurement or annotation is added to an image, that image automatically becomes a key image.

- Press the spacebar while the mouse is over the desired image to make the image a key image. When you press the spacebar again, the image will no longer be a key image.
- Press the Tab key to cycle forward through all the visible key images and **Shift+Tab** to cycle backwards.
- You can also right-click on the desired image and select **Key Image** to make the image a key image. When you right-click on the image and select **Key Image** again, the image will no longer be a key image.

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12.2.1 Key Image Series

The Key Image Series option (set in User General preferences) lets you place all key images in a series at the beginning of each Exam Row. The last key image is displayed on the top. Key images are used as a reference; cine loop and other features are not available for key images.

The key image series is located to the left of the exam images when the Exam Rack is viewed in horizontally and directly above the exam images when the rack is viewed vertically.

You can double-click a Key Image Series to open a key images popup window. See 'Using the Key Image Popup Window' (see page 222). You can set a User preference to display the key image series at the beginning of each exam rack. See 'Setting General Preferences' (see page 338).

The image manipulations options are displayed in the same way in the Key Image Series as on the exam image, except for Scout lines.

You navigate through a Key Image Series as follows:

- Use the mouse wheel or the arrow keys to cine through slices.
- Press the **Tab** and **Shift+Tab** keys to cycle through the series.

The Key Image Series updates in real time. As you mark images in the exam as "Key Images" by pressing the spacebar, the Key Image Series is populated simultaneously.

example

12.2.2 Using the Key Image Popup Window

The Key images popup window provides access to all key images of an exam, and includes more image manipulation features than are available for key images in the Exam Rack. For IntelliSpace PACS Enterprise, Multi Image Mode and the Magnifying Glass are available as options in the key image popup window, while they are not available from the key image series in the exam rack.

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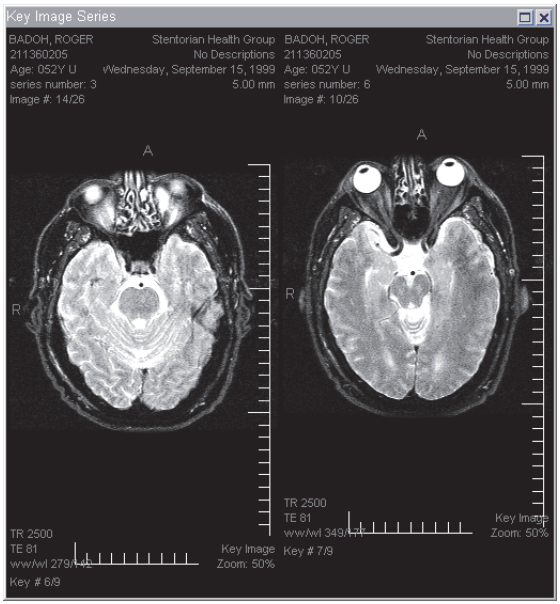


Figure 12.1 Key Image popup window example

Right-clicking in a Key Image Series popup window displays a menu with the following options:

- **Window Width/Level**: See 'Setting the Window Width/Level' (see page 231)
- **Measurements**: See 'Using the Measurement Palette' (see page 263)
- **Annotations** (excluding **Spine Labeling**): See 'Annotating Images' (see page 277)
- **Image Processing**: See 'Image Processing' (see page 236)
- **Save**: Saves the image (in full resolution) or window (what is currently visible) to the clipboard or a file. Supported image formats are BMP, TIFF, JPEG, PNG, or GIF.
- **Print > To Paper Printer**: See 'Printing to Paper' (see page 302)
- **Flip/Rotate:** See 'Flipping an Image' (see page 255) and 'Rotating an Image' (see page 255)

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- **Zoom Presets**: Allows you to select a preset zoom factor of **Fit to Window**, **100% (Original Size)**,**200%**, **300%**, **400%, or 1600%**.
- **Magnifying Glass:** See 'Using the Magnifying Glass Tool' (see page 249)
- **Multi Image Mode**: Lets you choose how you want to display stack images in Multi-Image mode in the Key Image Series popup window.
- **Delete All Measurements and Annotations** (when measurements and annotations are present): See 'Annotating Images' (see page 277)

12.3 Linking Image Series

The Link feature allows you to synchronize multiple images or series with an image or series that you have designated as the "master." You can link two or more images and zoom, pan, or view slices simultaneously. You can also link cloned or expanded windows of stacked series of the same imaging plane by dragging their respective popup windows together on the same monitor to snap them together.

When linking is activated, the following functions affect all linked images:

- Window Width/Level. See section 12.4 'Setting the Window Width/ Level' on page 231.
- Zoom. See section 12.9 'Zoom Presets' on page 247 and 'Using the Step Zoom Tool' (see page 251).
- Pan. See 'Panning Around an Image' (see page 254).

You can create the following types of links:
- Axial
- Sagittal
- Coronal
- Oblique
- Mirrored

Note the following

- A series is considered to be Axial, Sagittal, or Coronal if it is oriented within 5-degrees of the true plane corresponding axis.

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- A series is considered to be oblique if (1) It is not within 5-degrees of one of the major axes (Axial, Sagittal, Coronal) or (2) It contains images of different orientations such that they are not all aligned with the same axis.

The following link options are available:

- Linking single images, such as CR or DR images, in one or multiple exams with the same modality type. (For example: linking a CR Chest AP image of a new exam with a CR Chest AP image from a prior exam.)
- Linking single images, such as CR or DR images, in one or multiple exams with different modality type. (For example: linking a CR Chest AP image with a DR Chest AP image from a prior exam.)
- Linking series, like CT or MR series, with the same orientation in one or multiple exams with the same modality type. (For example: linking all axials in CT Chest exam that contains multiple axial series.)
- Linking series, such as CT or MR series, with the same orientation in one or multiple exams with different modality types. (For example: linking a CT Brain axial series of a new exam with a MR Brain axial series of a prior exam.)
- Linking mammography (MG) images using mirrored linking.

The Link feature lets you synchronize multiple images or series with an image or series that you have designated as the "master." Synchronize means that IntelliSpace PACS tries to do the following:

- Apply to all linked images the same image "navigation" options that are applied to the master, such as zoom or pan. (Functions such as flip, invert, rotate, and WW/WL remain independent.)
- Line up the images from the linked series with the one currently selected as the master. This lets you page through multiple series simultaneously. The series you page through acts as the master, and all the linked "slaves" display the image in their series that is at the closest location to the master.

12.3.1 Creating Links

1. Right-click the desired image or series and select **New Link** from the menu. This engages linking.

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2. To add more images, select those images, right-click and choose one of the following:
   - **Join Link**
   - **Join Mirror Link**
3. To select multiple images or series from different exams, press the **Shift** key while selecting images or series. Right-click and select **Link Selected Images** from the menu.
4. If more than one series in the same exam has the same orientation and the same reference, you can link them all simultaneously by selecting the **Link All Axial**, **Link All Sagittal**, **Link All Coronal**, or **Link All Oblique**, depending on the orientation.

   Note that an image can only be joined to a link of its type: Single Image, Axial, Sagittal, Coronal, or Oblique.

12.3.2 Unlinking Images

Do one of the following:

- To unlink a single image, right-click the linked image and select **Leave Link** from the menu.
- To unlink all linked images, right-click the linked image and select **Unlink All** from the menu.

12.3.3 Activating and Deactivating Links

- Do one of the following:
  - Right-click the image you created the first link for and select **Deactivate All Links** from the menu. This deactivates but does not remove the link.
  - Right-click the image that has a deactivated link and select **Activate All Links** from the menu.

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12.3.4 Link Symbols

The following links are displayed on the images as they are linked:

Symbol	Description
	Displayed in image thumbnails
LINK	Displayed in image popup windows
LINK	Displayed in diagnostic monitors if this has been configured in the System preferences.

12.3.5 Aligning Linked Series

DICOM contains information as to the frame of reference, which provides exact information as to the location of the patient at the time of scanning. Typically, images in the same exam have the same frames of reference, and images in different exams have a different frame of reference.

If the linked series have the same frame of reference, IntelliSpace PACS automatically aligns them when the link is created. If the linked series do not have the same frame of reference, IntelliSpace PACS cannot perform the initial alignment automatically. In this case, it relies on the user to align the series before linking them, and then uses information about the slice spacing to synchronize them as you navigate through the series.

You can adjust the initial manual or automatic alignment by temporarily disconnecting a series-image from a link, and manipulating each independently by pressing the **Shift** key while performing mouse or keyboard actions.

12.3.6 Creating Mirror Links

Mirrored links are primarily used for mammography studies. Based on how these images are acquired, mammography studies typically capture bilateral breasts and display images which are positioned sidelong either to the left or right side of image windows.

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Mirror linking allows you to link images at opposite coordinates. For example, when you zoom into an image that is positioned along the right side of an image window, IntelliSpace PACS automatically zooms into the other image positioned along the left side of the linked image window.

1. Right-click the first image and choose **New Link** from the menu. This engages linking.
2. To add more images, select those images, right-click and choose the **Join Mirror Link** from the menu.

When mirror linking is activated, the following functions affect all linked images.

- Step Zoom. See 'Zoom Settings' (see page 250).
- Pan. See 'Panning Around an Image' (see page 254).

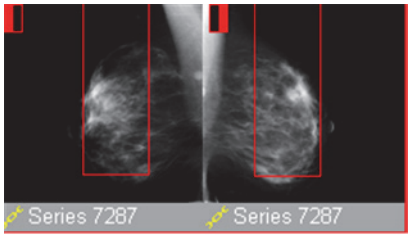


Figure 12.2 Image thumbnails showing Step Zoom with Mirror Link

12.3.7 Linking Warnings

WARNING

General Warning Message

The current implementation of the Link tool allows you to synchronize other windows/series with the window/series you are currently browsing through. In other words, there is one master window/series (typically the one that you have selected with your mouse) and IntelliSpace PACS tries to line up the images of the other linked windows. Therefore, you should always review each and every series by paging through them individually, and never rely on linking as a way to review all images within a given exam. Browsing through a series that is part of a link may not display all the images that are available in the other linked series.

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WARNING

When using the series linking feature, it is possible that images may be missing, which could cause misdiagnosis. Possible causes of missing images are:

- ***Linking multiple series with different slice thickness***
- ***Linking series that contain different body parts or cover a larger or smaller region***
- ***Linking Oblique series***

WARNING

Linking a Multi-Phase Series with Another Series

Multi-phase studies contain multiple images with the same location identifier. Paging through a multi-phase series that has not been split typically results in jumping back to the first slice location each time you reach the end of each phase within the series.

- ***If a multi-phase series is used as the master, the other linked series are synchronized on location and display the image with closest location to the one displayed in the master series.***
- ***If the non multi-phase series is used as the master, IntelliSpace PACS tries to find the image with the closest location in the multi-phase series, and because there are potentially multiple matches, IntelliSpace PACS displays the best match from the first phase. (In this example IntelliSpace PACS would never display image 7 through 12.)***

This means that it is not possible to review all images of a multi-phase series by paging through another series while using the Link tool.



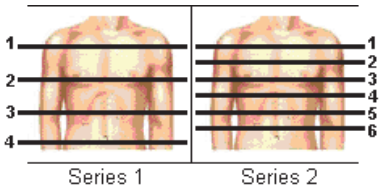
- ***If a multi-phase series is not split correctly, and a user links multiple series where one of the series contains multiple phases, the link function will not work correctly because not all images will be displayed while paging through the series. IntelliSpace PACS can be configured to automatically split all studies from a particular CT modality in multiple series based on DICOM tag (0021,0012). However, because not all modalities can be configured to provide a unique identifier that can be used for splitting, IntelliSpace PACS provides the ability to manually split studies. A technologist can perform this function and save it as a Presentation State, or a Radiologist can manually split a study after first opening the study.***

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WARNING

Linking Multiple Series with Different Slice Thickness

An exam might contain multiple series acquired at different (or even variable) slice thickness. For example, one series might be acquired at 10mm slice thickness and one at 2mm. If you link these series and page through them using the very thick 10mm series as the master, many images from the 2mm series will be skipped. If you page through the images using the very thin 2mm series as the master, every image of the 10 mm series will be displayed. This means that paging through multiple series simultaneously is possible with the Link tool, but images will be skipped, unless the series with the thinnest slice thickness is used as the master.



WARNING

Linking Series that Contain Different Body Parts

Series that contain different body parts or cover a larger/smaller region of the body can be linked. For example, a CT series that contain a CHEST-ABDOMEN-PELVIS might be linked with a CT series that contains only a CHEST. By navigating through the CT CHEST series, you will never be able to see the ABDOMEN-PELVIS of the other series. Conversely, by using the CHEST-ABDOMEN-PELVIS as the master series, you can look at the CHEST images side-by-side, as well as at the ABDOMEN-PELVIS images of the master series. This means that using the Link tool, you cannot go beyond the scope of the master. This might be obvious if the body parts are totally different like in the CHEST-ABDOMEN-PELVIS example, but sometimes they are the same, but they do not start at exactly the same location. In this case, you might miss a few slices.

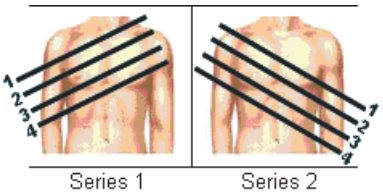


WARNING

Linking Oblique Series

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IntelliSpace PACS allows you to link oblique series. The goal is to provide users with the ability to link oblique series that are more or less in the same orientation. However, IntelliSpace PACS does not prevent you from linking obliques that have totally different orientation. This means that linking obliques that are not of roughly the same orientation leads to unexpected behavior in IntelliSpace PACS.



12.3.8 Linked Exams Use Case: CT Chest-Abdomen-Pelvis

When exams are linked before being marked as Read, when the linked exams are marked Read, only one Presentation State is created, because the linked exams were not read separately. Therefore, when a linked exam is opened, a Presentation State may not be applied, which can display incorrect measurements on screen.

For example, consider a Chest-Abdomen-Pelvis series, where three exams are linked and point to the same DICOM Study. Typically, all three exams are read in one dictation session, loading the CT Chest exam from the worklist.

Users that subsequently open either the CT Abdomen or CT Pelvis exam will default back to the original DICOM Presentation State and not see the added value stored under the CT Chest DICOM Presentation State.

12.4 Setting the Window Width/Level

The **Window Width and Level** settings allow you choose optimal viewing to highlight certain details for better visibility. These options are available when you right-click on an image on the Canvas Page.

- Do one of the following:

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- Right-click on an image and from the menu select **Window Width/ Level** and the option you want.
- Click and hold down the left mouse button while simultaneously dragging your mouse. Drag the cursor horizontally across the image to increase or decrease the window width. Drag the cursor vertically across the image to increase or decrease the window level.

NOTE ***When you adjust the Window Width and Level for a series, all slices in that series are affected. To adjust the Window Width and Level on one slice in a series, hold down the "L" key while making the adjustment.***

For CTs, the Window Width/Level menus are listed in three separate areas, from top to bottom:

- **Default WW/WL** and **Modality Default** for all exams
- Custom user Window Width/Level values (Abdominal_NAB, Bone_NAB, Brain_NAB, and so on), which are defined in the User preferences. These settings are mapped to the number keys (1 through 9) in the order listed in the **Preferences** dialog box, allowing you to quickly apply a Window Width/Center setting while viewing images. See 'Setting Window Width/Center User Preferences' (see page 344).
- System WW/WL Presets (Abdominal, Bone, Brain, and so on), which are defined in the **System** preferences. See 'Editing a Window Width/Center Preference' (see page 359).
- The **Restore Color Image** option displays the current color image or stack of color images in its original form, without applying any window width or level values.



WARNING ***The Restore Color Image feature is configured using DICOM Sources to specify the source and modality type of the study. Please exercise caution when using this feature with scanned-in images.***

For other modalities, such as CR and MR, the **Window Width/Level** menus are listed in three separate areas, from top to bottom:

- **Default WW/WL**
- **Modality Default** (if defined)

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- **Histogram Calculation**

12.4.1 Using the Default WW/WL

The default WW/WL values can be either **Modality Default** values or **Histogram Calculation** values. The Default WW/WL is the same as **Modality Default** when the WW/WL values are provided from the modality. If no Modality WW/WL values are provided, the Default WW/WL values will be the same as **Histogram Calculation** values.

- Right-click on an image and from the menu select **Window Width/Level** and **Default WW/WL**.

12.4.2 Using the Modality Default WW/WL Values

Modality Default values are the Window Width and Window Level provided by the modality. DICOM sources using DICOM values should be configured for a specific AE Title to ensure that images from other devices are not impacted.

The DICOM modality values are stored in the Window Center tag (0028,1050) and the Window Width tag (0028, 1051).

- Right-click on an image and from the menu select **Window Width/Level** and **Modality Default**.

12.4.3 Using the Histogram WW/WL Calculation

The histogram is a graph that shows the tone (grayscale value) distribution (total pixel count for each grayscale value) in the image. It maps luminance, which is defined as the way the human eye perceives the brightness of objects. By defining the luminance, the histogram provides the Window Width and Center for the image, instead of the modality.

NOTE ***Histogram calculation is not available for the CT modality.***

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The histogram distributes the range of tone (grayscale value) through categories to provide an image that presents the optimal range of grayscale distribution for an image according to the way the human eye perceives the scale of contrast, by evenly distributing the grayscale values across the possible range of values.

Histograms for low resolution images (for example, thumbnails) are significantly different than historgrams for higher resolution images. The window width/level values for these low resolution images may not be suitable. Also, IntelliSpace PACS forces a histogram calculation of the DICOM values if one of the following conditions exists:

- The window width is greater than the pixel range times 2
- The window level is greater than the pixel maximum times 2
- The window level is less than the pixel minimum times 2

The pixels in an 8-bit grayscale image have a contrast (grayscale) value between 0 and 255, where 0 is the blackest at the left end and 255 is the whitest at the right end.

- Right-click on an image and from the menu select **Window Width/Level** and **Histogram Calculation**.

12.5 Value of Interest LUT (VOI LUT)

Value of Interest Look Up Tables (VOI LUT) are DICOM values that modalities use to define specific processing algorithms for diagnostic presentation of X-ray images. By default, VOI LUT is not applied to images containing VOI LUT. However, VOI LUT can be applied by default to the images for an entire site when the System Administrator selects the **Automatically apply VOI LUT when available** in the General System preferences. See 'Setting General Preferences' (see page 356).

The benefits of VOI LUTs include:

- Post-processing corrections for detector defects
- Enhancement of the image by reducing noise

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- Altering the dynamic range by a number of methods that improve the visibility of specific pathologies

Value of Interest Lookup Tables (VOI LUT) can be used to enhance different features of the image (for example, “bone” versus “lung” versus “soft tissue” on a chest radiograph). Because the acquisition device might have already performed this processing, a VOI LUT may be used to provide alternative presentations of the **Window Width/Level** of an image.

VOI LUTs are used primarily with CR/DR images extracted from the DICOM tag (0028,3010). This tag can reference one or more VOI LUTs associated with an image. Images can contain single or multiple VOI LUTs.

NOTE ***If the DICOM header is missing a LUT, a default LUT is used. This prevents an incorrect LUT from being applied, as an image’s gray values may not correctly display.***

When VOI LUTs are applied, IntelliSpace PACS adds an additional VOI LUT option with “(VOI LUT name)”. If VOI LUT is applied, the user can still adjust the image gray scale with the mouse. If modified, the VOI LUT name changes and “MOD” is added, where “MOD” indicates that the original VOI LUT has been modified.

While you right-click, the **Window Width and Level** options in the menu are replaced by VOI LUT Options when VOI LUT is enabled. The image can still have Window Width and Level adjusted on top of the VOI LUT presentation. The modified VOI LUT is preserved when you save a presentation state of the exam. VOI LUT menu options can include:

- **Disable VOI LUTs**: If VOI LUT applied
- **Restore Default Settings**: If VOI LUT is applied and you modified the WW/WL setting
- **VOI LUT name**: If enabled in the General System preferences
- **(VOI LUT name) MOD**: If the original VOI LUT was modified

NOTE ***After a VOI LUT has been saved in a presentation state, the original VOI LUT may not be reproducible. If a subsequent Presentation State is created from this second VOI LUT, the popup window will designated it as “PS MOD PS MOD” to indicate that the VOI LUT is removed by two degrees from the original.***

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Figure 12.3 VOI LUT example

- Right-click the image and from the menu select **VOI LUT Options**.
- To disable the VOI LUT for the image and revert to the Histogram calculation Window Width and Level values, select **Disable VOI LUTs** from the menu.

12.6 Image Processing

The following image processing options are available. The Median Filter option only applies to the current image, not an entire multi-slice series. The appropriate tool depends on the type of image you are viewing. You should try various tools to find the best solution for viewing the enhanced image.

NOTE ***The image contrast settings affect only the current image display. Your changes will not be saved.***

- **Invert Image**: Applied to all images in a multi-slice series. See 'Inverting an Image' (see page 239)

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- **Edge Enhance**: Applied to all images in a multi-slice series. See 'Enhancing the Edges of an Image' (see page 239)
- **Edge Detect**: Applied to all images in a multi-slice series. See 'Detecting the Edges of an Image' (see page 240)
- **Median Filter**: Only applied to one image (current image of multi-slice series). See 'Filtering the Image' (see page 241)
- **CLAHE** (Contrast Limited Adaptive Histogram Equalization): Only applies to single images (such as CR, DX, MG, and so on). See 'Using Contrast Limited Adaptive Histogram Equalization' (see page 242)
- **Interpolation** (pixel replication, bilinear interpolation, bicubic interpolation): See 'Selecting an Interpolation Scheme' (see page 243)

You set options for the processing images features in the **Preferences** dialog box. See 'Setting Image Processing Preferences' (see page 346). System Administrators can adjust the supplied settings for the whole institution. See 'Setting Image Processing Preferences' (see page 359).

When you modify or add **Image Processing** settings, IntelliSpace PACS uses these settings over the supplied **Image Processing** preferences.

Because the **Image Processing** filters alter the digital data of the original DICOM, images/studies with **Image Processing** filters cannot be printed to film as diagnostic-quality images. See 'Image Processing Effects' (see page 47).

Except for the **Invert Image** tool, when you apply an image processing filter to an image, a **P** (Processed) icon is displaced in the lower-right corner of the image. Note that image processing filters cannot be printed to a DICOM device. Images with image processing can be printed to paper, copied to the clipboard, or saved as a file.

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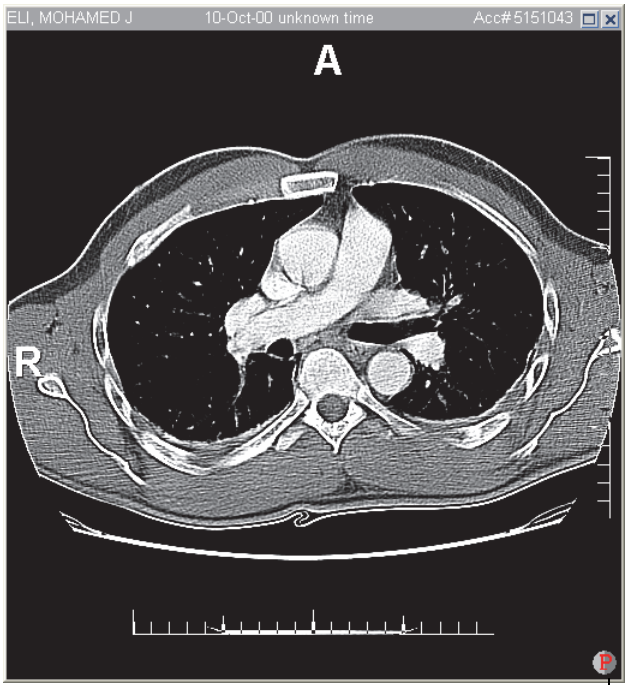


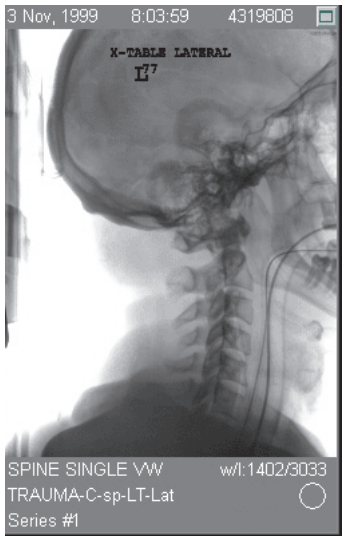
Figure 12.4 Image with Image Processing icon

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12.6.1 Inverting an Image

The **Invert Image** feature reverses the black and white coloration of the selected image.

Figure 12.5 Inverted image



To invert an image:

- Right-click the image and from the menu, select **Image Processing**, then **Invert Image**.

12.6.2 Enhancing the Edges of an Image

The **Edge Enhance** feature uses a Laplacian method to increase the visibility of edges in the image. There are three degrees of application: **Light**, **Medium**, and **Strong**. You can change the default setting in the **Image Processing** section of the **Preferences** dialog box. See 'Setting Image Processing Preferences' (see page 346).

When you select the **Edge Enhance** feature it is applied to all images in a series. This may cause a slight display delay when IntelliSpace PACS actively processes these images in multi-image or **Fast Cine** mode.

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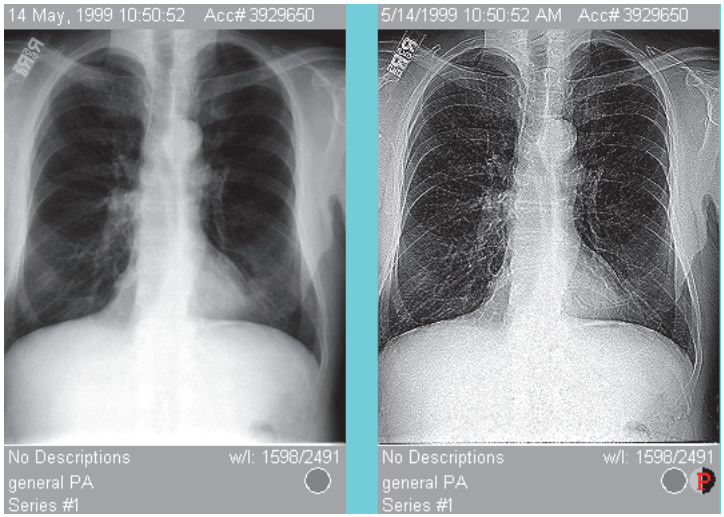


Figure 12.6 Image with Edge Enhance Filter

1. Right-click the image and from the menu, select **Image Processing**, then **Edge Enhance**.
2. Press the comma and period keys to increase or decrease the degree of edge enhancement.

12.6.3 Detecting the Edges of an Image

The **Edge Detect** tool is an alternative to the **Edge Enhance** tool, and uses a Sobel operator to increase the visibility of edges. There are three degrees of application: **Light**, **Medium**, and **Strong**. You can change the default setting in the **Image Processing** section of the **Preferences** dialog box. See 'Setting Image Processing Preferences' (see page 346).

When you select the **Edge Detect** feature it is applied to all images in a series. This may cause a slight display delay when IntelliSpace PACS actively processes these images in multi-image or **Fast Cine** mode.

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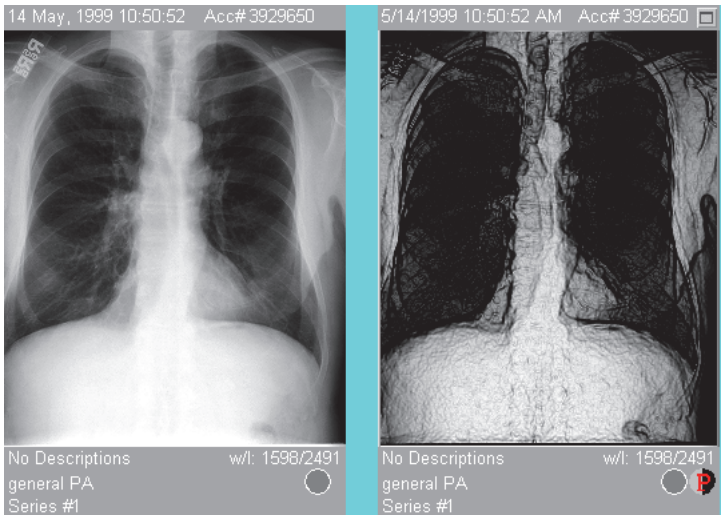


Figure 12.7 Image with Edge Detect Filter

1. Right-click the image and from the menu, select **Image Processing**, then **Edge Detect**.
2. Press the comma and period keys to increase or decrease the degree of edge detection.

12.6.4 Filtering the Image

The **Median Filtering** tool utilizes a common filtering method to reduce noise in the image. For a multi-slice series, Median Filtering only applies to the current image, not the entire series. You can change the default setting in the **Image Processing** section of the **Preferences** dialog box. See 'Setting Image Processing Preferences' (see page 346).

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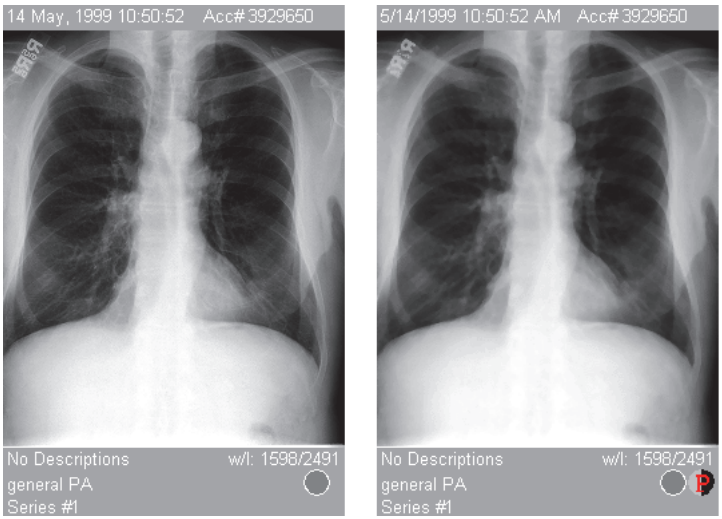


Figure 12.8 Image with Median Filter

- Right-click the image and from the menu, select **Image Processing**, then **Median Filter**.

12.6.5 Using Contrast Limited Adaptive Histogram Equalization

The CLAHE (Contrast Limited Adaptive Histogram Equalization) tool utilizes an adaptive form of histogram equalization that enhances the contrast adoptively across the image. You can use CLAHE with the following modalities: CR, DX, MG, and XA.

You can change the default setting in the **Image Processing** section of the **Preferences** dialog box. See 'Setting Image Processing Preferences' (see page 346).

When CLAHE is applied, the Window Width/Window Level of the image is automatically adjusted. When CLAHE is selected, the WW/WL is automatically recalculated using the Histogram Calculation because that data range has changed. The initial WW/WL values are restored when CLAHE is turned off.

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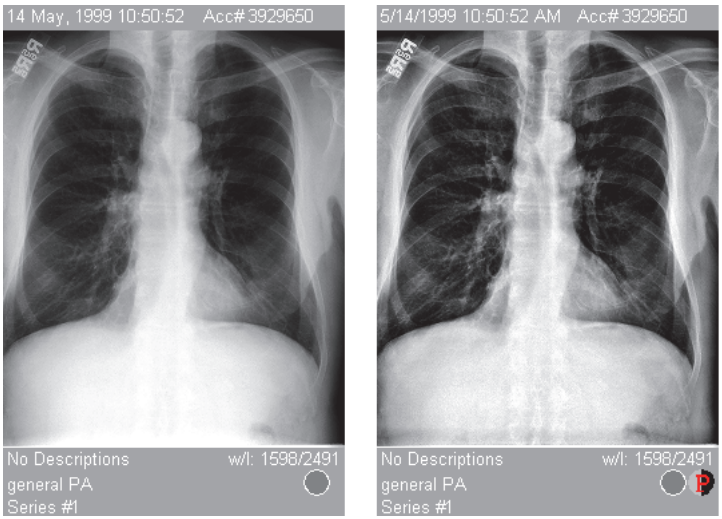


Figure 12.9 Image with CLAHE Filter

To toggle the CLAHE filtering, do the following:

- Right-click the image and from the menu, select **Image Processing**, then **CLAHE**.

12.6.6 Selecting an Interpolation Scheme

Interpolation is the process of adding or subtracting pixels by analyzing the adjacent pixels and estimating intermediate values to increase or decrease the resolution of an image. When you resize an image in IntelliSpace PACS, you can choose which interpolation scheme you want to use.

- Right-click the image and from the menu, select **Image Processing**, then **Pixel Replication**, **Bilinear Interpolation**, or **Bicubic Interpolation**. The option you select is checked in the menu.
  - **Pixel Replication**: Performed by sampling the nearest neighboring pixel. Step-like straight boundaries may be evident after the transformation.

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- **Bilinear Interpolation**: The default presentation of images in IntelliSpace PACS, performed by sampling four neighboring pixels. **Bilinear Interpolation** may decrease resolution and blurring by averaging the step-like boundaries that may occur with **Pixel Replication**.
- **Bicubic Interpolation**: Preserves fine details in the image very well. It is performed by sampling 16 neighboring pixels, and does not have the step-like boundary problem of **Pixel Replication** or the blurring problem of **Bilinear Interpolation**.

12.7 Using the Scout Tool

The Scout tool allows you to see the planar location of an image using another image within the same study as a reference frame. Scout lines are displayed on the image or series as you move your mouse over other images of a different orientation. Three types of scout lines are available: **Single**, **Bracket**, and **All**. The line types are set in the Display section of the User preferences. See 'Setting Display Preferences' (see page 350).

The Scout tool is available for CT, MR, and PT modalities and works with the Localizer tool. See 'Using the Localizer Tool' (see page 245).

To leave the image selected for displaying scout lines unobstructed, the reference lines only appear when the cursor is passed over another image or series. As the other series is reviewed, the corresponding scout line is highlighted to indicate the planar location of the image, as seen below.

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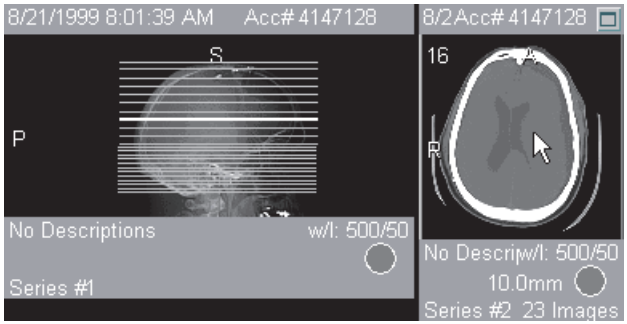


Figure 12.10 Scout lines example

1. Do one of the following:
   - Right-click the image or series and select **Scout Line Mode** from the menu.
   - Press F11.
2. The **Scout Mode** item is displayed with a check mark in the **Image** menu. Select **Scout Mode** (or press F11) again to remove the scout lines.

12.8 Using the Localizer Tool

Like Scout lines, the Localizer tool helps you visualize and navigate to a location in multiple series with different orientations. You can use the Localizer tool to navigate through multiple series with different orientations (Axial, Sagittal, and Coronal) simultaneously.

A crosshair (+) is displayed in every series of an exam at the x/y coordinates that correspond to the location of your cursor. The crosshairs move in sync as you move the cursor over the specified series.

The Localizer tool is useful for PET/CT studies, allowing you to create a "ghost" cursor on the other Axial Slices. (This only works if the CT and PET images have the same DICOM frame of reference.)

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You set whether or not the Localizer tool shows scout lines in the Display section of the User preferences. See 'Setting Display Preferences' (see page 350).

NOTE ***The state of the Localizer tool for an image or series is not saved as part of Presentation States. Also, clicking and dragging does not adjust the Window Width and Level of Localizer-enabled images.***

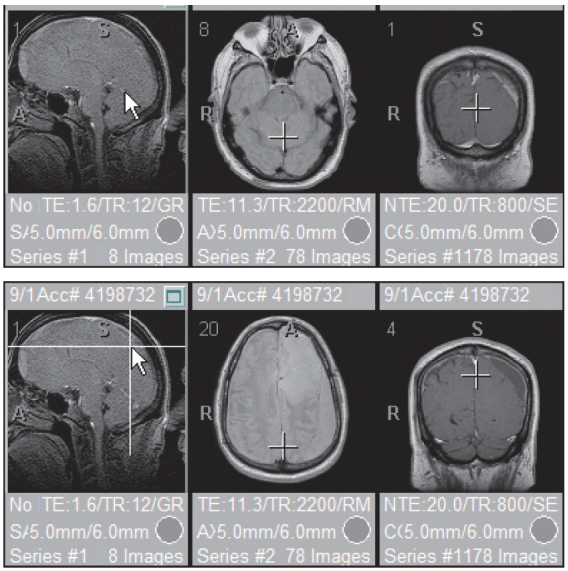


Figure 12.11 Localizer tool example

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1. Do one of the following:
   - Right-click the image or series and select **Localizer Tool** from the menu.
   - Press F12.
2. The **Localizer Tool** item is displayed with a check mark in the menu. Select **Localizer Tool** again to remove the localizer lines.

WARNING

Multi-phase studies contain multiple images with the same location identifier. Paging through a multi-phase series that has not has been split typically results in jumping back to the first slice location each time you reach the end of each phase within the series. If you use the Localizer tool to navigate through a multi-phase series, you will notice that the other linked series are synchronized on location and basically display the image with closest location to the one displayed in the master series. If the non multi-phase series is used as the master, IntelliSpace PACS tries to find the image with the closest location in the multi-phase series, and because there are potentially multiple matches, IntelliSpace PACS displays the best match from the first phase. (In this example IntelliSpace PACS would never display image 7 through 12.) In other words, you cannot review all images of a multi-phase series by paging through another series while using the Localizer tool.



12.9 Zoom Presets

You can zoom in on an image up to 1600%. When you zoom, the scales at the bottom and right of the image adjust to always show 10 mm per division. Scale glyphs are placed every 10 mm (1 cm), but the lines are drawn white on black embossing to improve visibility. The size of the division is also displayed with embossed text. Indicators at the 5th and 10th positions are distinguished by longer lines.

Do one of the following:

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- Roll the mouse-wheel forward or use the Down or Right arrow keys. The image zooms in at the location of your cursor. To zoom out, roll the mouse-wheel backward or use the Up or Left arrow keys. To zoom into an image-series, such as an MR or CT exam, left-click the mouse while holding down the **Alt** key and drag the mouse forwards to zoom in or backwards to zoom out.
- Right-click on the image and select **Zoom Presets**, then select the desired zoom level.

When you zoom, the scales at the bottom and right of the image adjust to show one of the following:

- 10 mm per division at smaller zoom factors
- 1 mm per division at larger zoom factors

To show the current size of the division, left-click on the scale and hold the mouse button down.

NOTE

- ***Alternatively, you can use the Step Zoom tool to step sequentially through portions of the image at full resolution. See 'Using the Step Zoom Tool' (see page 251).***

Fit to Window Zoom Preset

Fit to Window applies an adjusting zoom factor that always maintains the entire image visible on the screen.

- Right-click on the image and select **Zoom Presets**, then select **Fit to window**.

Pixel-to-Pixel Zoom Preset (Original Size)

Pixel-to-pixel is a zoom setting where a single pixel in the image corresponds to a single pixel on the screen.

- Right-click on the image and select **Zoom Presets**, then select **100% (Original size)**.

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12.10 Using the Magnifying Glass Tool

The Magnifying Glass tool allows you to zoom into a small portion of the image using a pre-configured magnification factor. When selected, the center of the Magnifying Glass window is located at the last location of the cursor. You can use the Magnifying Glass tool on an image popup window or a virtual monitor.

By default, the **Y** key toggles the Magnifying Glass tool on and off.

The size and magnification factor of the Magnifying Glass window are set in the User Display preferences. See 'Setting Display Preferences' (see page 350). You can set a keyboard shortcut preference for the Magnifying Glass tool. See 'Setting Keyboard Shortcut Preferences' (see page 346).

The Magnifying Glass tool has two modes:

- Roaming: Any movement of the mouse moves the Magnifying Glass above the underlying image showing the image zoomed in (in the set factor) so that the underlying portion of the image is centered and zoomed in the Magnifying Glass window, just like a physical magnifying glass. In Roaming mode, the cursor is invisible. You can click to switch to Stationary mode.
- Stationary: The Magnifying Glass window stays stationary when the mouse moves, and the cursor is visible. You can click to switch to Roaming mode.

Note the following:

- You can only have one Magnifying Glass window open at a time in each popup window or virtual monitor.
- You cannot resize the Magnifying Glass window by dragging its border.
- You cannot move the Magnifying Glass outside the limits of the window in which it appears. This means that if a window has multiple images, the Magnifying Glass roams above all of them, identifying the image being magnified.

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- If you use the Magnifying Glass in an image popup window and resize the window, the Magnifying Glass stays at its current location.
- Overlays or annotations on the original image are not magnified.
- Cine mode is not available when Magnifying Glass is being used.
- If you change the zoom of the original image to be equal to or bigger than the zoom factor for the Magnifying Glass window, the zoom factor of the Magnifying Glass window increases to one increment above the zoom factor of the original image.

1. To select the Magnifying Glass, do the following:

   - Right-click on the image in the popup window or virtual monitor and select **Magnifying Glass.**

2. To adjust the settings for the Magnifying Glass tool, right-click and select one of the following options:
   - **Window Width/Level** options
   - **Zoom Presets** (200%, 300%, and 400%). These presets are only available if the underling image has a smaller zoom factor. In a single image, you can use the mouse wheel to change the zoom factor of the Magnifying Glass.

12.10.1 Closing the Magnifying Tool

- Right-click on the magnifying glass and select **Close**.

12.11 Zoom Settings

NOTE ***The image zoom settings affect only the current image display. Your changes will not be saved.***

12.11.1 True Size Zoom

WARNING ***Do not use True Size as a measurement tool.***

The True Size setting approximately represents the actual size of the anatomical structures on the screen.

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12.11.2 Using the Step Zoom Tool

The Step Zoom tool allows you to step sequentially through portions of an image in an image popup window or virtual monitor at full resolution, instead of having to zoom and pan manually. The number of steps is determined by the size of the image and the size of display area. (The maximum number of steps is 16.)

For mammography images, the first step displays the region of glandular tissue from the anterior side of the breast. Thereafter, the order in which you step through the image is left to right, from top to bottom, as shown in the following example.

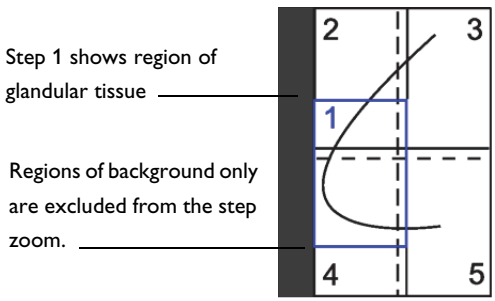


Figure 12.12 Step Zoom sequence example. Dashed lines indicate overlap.

The Step Zoom tool divides the full-scale image into smaller overlapping portions at the size of the window that hosts the image. The order in which you step through the image is top to bottom, then left to right, as shown in the following example.

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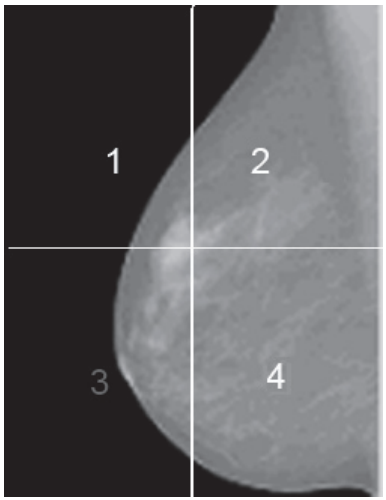


Figure 12.13 Step Zoom example

By default, the **S** key initiates the Step Zoom tool and is used to sequentially step through the image. If desired, you can set a User preference to define a different keyboard shortcut. See 'Setting Keyboard Shortcut Preferences' (see page 346).

Note the following:

- The number of steps for an image is based on the size of the full-scale image and the size of the window. For example, if the size of the full-size image is 1000X2000 pixels and the size of the window is 400X600, the number of steps is 12 (3X4).
- The Step Zoom tool has no effect on a full-scale image that is not bigger than the size of the window, or if the number of steps required to step through all the parts of the image is greater than 16.
- There is a minimal overlap of 10% of the size of the window between each horizontal and vertical step area.

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- When you use the Step Zoom tool in a fixed window, such as a virtual monitor, the correlating thumbnail shows a red navigation rectangle representing the portion of the image that is currently being viewed.
- If you resize, flip, rotate, re-hang, split the monitor, or change the layout of the window, the Step Zoom tool cycle is reset.
- You can use the Step Zoom tool in unlinked, linked, and mirror linked MG images. If the linked images are not the same size (and/or their windows are not the same size), the number of steps may differ between the images. This could cause a synchronization loss as you step through the images.

1. Display an image in an image popup window or virtual monitor. The size of the image in 100% zoom must be larger than the size of the window in which is it displayed for the Step Zoom tool to work.
2. Press **S** to initiate the Step Zoom tool. You can set a User preference to change this default key if desired. See 'Setting Keyboard Shortcut Preferences' (see page 346).
3. Continue to press **S** (or the other assigned key) to step through different portions of the image, from top to bottom and left to right.
4. When all the portions of the image are shown, the next time you click **S** (or the other assigned key), the image is shown in Fit to Window mode.

12.11.3 Digital Mammography Images Display

Digital Mammography images viewed in IntelliSpace PACS may display a thin white outline, a few pixels wide, along the outer edge of the breast tissue. For this issue to present in IntelliSpace PACS the following things must occur:

- The sending modality applies a pixel padding value to discriminate non anatomic regions of the image
- The pixel padding value is far outside the dynamic range of the anatomic data representation
- The image data is offset from zero by several thousand gray scale levels
- The image is viewed in IntelliSpace PACS at a zoom of 50% or less

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After receipt of such images in IntelliSpace PACS, when the iSyntax technology is applied, the wavelet representation of the discontinuity created by the applied pixel padding value can result in the presentation of the white outline when the image is viewed at a zoom value of 50% or less. This does not occur when the image is viewed at a zoom value of greater than 50%.

This type of discontinuity can never occur in anatomy. The outline is caused by artificial pixel padding values, and appears outside of the breast tissue alongside the outer edge of the breast. The image quality is not affected by this problem. While the outline is displayed at a zoom of 50% or less, there is no corruption of the image or image information. When the images are viewed diagnostically, at a magnification close to one (100% zoom), the outline is not present.

12.12 Panning Around an Image

You can use the Step Zoom tool to step sequentially through portions of the image at full resolution, instead of having to pan manually. See 'Using the Step Zoom Tool' (see page 251).

- Hold down the mouse-wheel button while dragging your mouse in the desired direction. To pan around an image-series, such as an MR or CT exam, left-click the mouse while holding down the **Ctrl** key and drag the mouse to display the desired area.

12.13 Minimizing Images

- Right-click in the exam margin and from the menu, select **Minimize Images**. Note that if you want to re-enlarge images after minimizing them, you must do it manually (there is no Maximize option).

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12.14 Flipping an Image

The **Flip Image** feature allows you to rotate the selected image horizontally (around the y-axis) or vertically (around the x-axis). It can be useful to flip a study acquired as prone to look as supine, for ease of interpretation (for example, kidney stones and other renal protocols).

- Right-click on the image and from the menu select **Flip/Rotate**, then **Flip Horizontal** or **Flip Vertical**. Note that one of the orientation markers at the top or left of the image changes (for example, from "A" (Anterior) to "P" (Posterior).

NOTE ***Keyboard shortcuts to Flip Horizontal or Flip Vertical can be set in the User preferences.***

12.15 Rotating an Image

The **Rotate Exam** feature allows you to rotate the selected image or series in 90 degree increments, clockwise or counter-clockwise.

- Right-click on the image or series and from the menu select **Flip/Rotate**, then **Rotate 90 CW** or **Rotate 90 CCW**.

12.16 Sorting Images

You can sort images by:

- **Table Position Ascending**
- **Table Position Descending**
- **Image Number Ascending**
- **Image Number Descending**

NOTE ***This option is not available for multi-frame images that have the same image number.***

- Select the image and from the menu select **Flip/Rotate/Sort/Split**, then the desired sort option.

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12.17 Splitting Exams

The **Split Exam** feature allows you to temporarily split a series according to specific DICOM tags. This feature is only available for stacked images, especially multi-frame multi-phased stacked windows. Note that you cannot split clones. If there are no attributes available for splitting, or if the split criteria are not met, a message displays stating that the exam cannot be split.

1. Right-click on the image and from the menu, select **Flip/Rotate/Sort/Split**.
2. Choose **Split Exam** from the sub-menu. The **Split Exam** dialog box displays.
3. Check the DICOM tags that you wish to use for splitting the series. The tags depend on the tags associated with the type of series you have selected.
4. Click **OK**. The original series is broken into different series, according to the selected attributes. This is not a permanent change to the exam, but rather a type of display. To preserve the split for later viewing, you must save a Presentation State. See 'Using Presentation States' (see page 216).

12.18 Viewing Shutter Images

IntelliSpace PACS supports DICOM circular and rectangular shutters. If modalities send values in DICOM tags (0018,1610; 0018,1612) for circular shutters and DICOM tags (0018,1602; 0018,1604; 0018,1606; 0018,1608) for rectangular shutters, IntelliSpace PACS displays a "shuttering" effect on images that tone down the background of an image so users can focus on a specific region.

To turn the shuttering effect off, hold down the **Ctrl + Shift + F6** keys.

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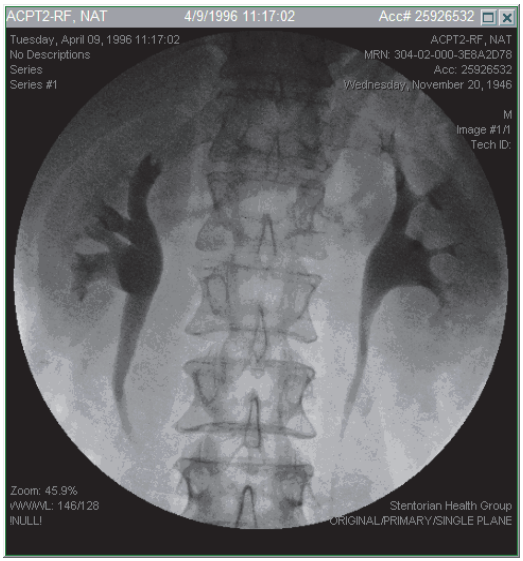


Figure 12.14 Circular shutter effect

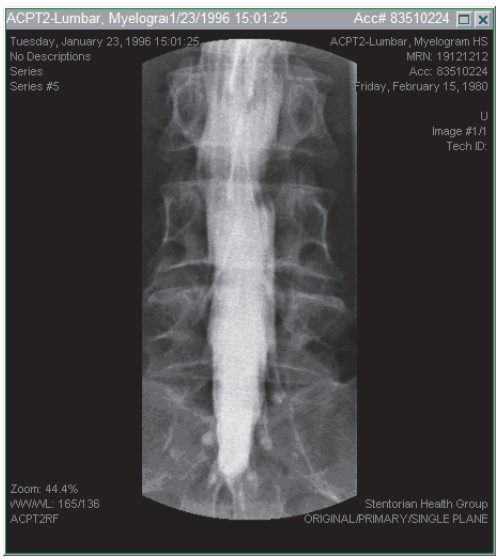


Figure 12.15 Rectangular shutter effect

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13 Measuring and Annotating Images

IntelliSpace PACS includes the following tools you can use to measure and annotate images.

- **Measurement palette**: See 'Using the Measurement Palette' (see page 263)
- **Ruler**: See 'Using the Ruler Tool' (see page 265)
- **Angle**: See 'Using the Angle Tool' (see page 267)
- **Cobb Measurements**: See 'Taking Cobb Measurements' (see page 268)
- **ROI Circle**: See 'Using the ROI Circle Tool' (see page 269)
- **ROI Freehand**: See 'Using the ROI Freehand Tool' (see page 271)
- **ROI Ellipse:** See 'Using the ROI Ellipse Tool' (see page 273)
- **Point Value**: See 'Using the Point Value Tool' (see page 275)
- **Calibrate**: See 'Calibrating Images' (see page 276)
- **Ultrasound measurements**: See 'Taking Ultrasound Measurements' (see page 277)
- **Text Annotate**: See 'Annotating Images' (see page 277)
- **Spine Labeling**: See 'Spine Labeling' (see page 280)

For information on the format used for measurement value display for Projection Radiography modalities, see 'Measurement Values for Projection and Non-Projection Radiography Modalities' (see page 260).

When you add a measurement or annotation to a window, IntelliSpace PACS automatically marks that image as a key image. You cannot use annotations, measurement tools, and the **Localizer** tool at the same time.

WARNING

Measurement values are modality dependent. The measurement values that IntelliSpace PACS displays are derived from information sent by the modality responsible for generating the image being measured. If this modality is incorrectly configured or defective, IntelliSpace PACS measurement values may be adversely

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affected and may be incorrect. Philips strongly recommends the use of an appropriately placed object of known size for determining what magnification factor has been applied to the image.

13.1 Changing the Font or Line Style

When you right-click on a measurement or annotation, you can select **Edit Font**, **Edit Line Style**, or both, depending on the measurement or annotation.

- For **Font**, you can select from a list of fonts available on your workstation. To resize the font of a text annotation, drag a corner of the text box.
- For **Line Style**, if the line is solid, you can select a line width from 1 (thinnest) to 4 (thickest). The line style can be solid, dashed, or dotted.

13.2 Measurement Values for Projection and Non-Projection Radiography Modalities

The following format is used for measurement value display for Projection Radiography modalities: <**value**> <**units**> (<**code**>):

- <**value**> is the floating point value of the measurement
- <**units**> is the units of the measurement (e.g., mm, cm, Tesla, etc.)
- <**code**> is one of the following:

<code>	Pixel Spacing Tag Used	Additional Conditions
Geometric	(0028,30)	Tag (0028,0A02) has the value GEOMETRY
Imager	(0018,1164)	
Geometric	(0018,1164) & (0018,1114)	(0018,1114) is not equal to 0 or 1
Fiducial	(0028,0030)	Tag (0028,0A02) has the value FIDUCIAL

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<code>	Pixel Spacing Tag Used	Additional Conditions
Calibrated	IntelliSpace PACS manual calibration	
Unknown	(0028,0030)	When tag (0028,0A02) is absent

The following format is used for measurement value display for non-Projection Radiography modalities: <**value**> <**units**>:

- <**value**> is the floating point value of the measurement
- <**units**> is the units of the measurement (e.g., mm, cm, Tesla, etc.)

IMPORTANT ***For Projection Radiography modalities only, if there are measurements that were displayed from a presentation state that was created before IntelliSpace PACS 3.6.48/4.1.48 whose values are different than the current version because of a different pixel spacing value, both of the measurements using the original pixel spacing and the currently selected pixel spacing are displayed. The current measurement is displayed on top and the original measurement from the presentation state is displayed on the bottom.***

13.2.1 Accuracy and Precision in Measurements

IntelliSpace PACS relies directly on the information provided by the manufacturers of the imaging modalities in order to perform any measurements. The accuracy of these measurements is determined by the values and interpretations of related fields within the DICOM imaging standard.

For example, for tomographic modalities, pixel size is determined based on the value of the "Pixel Spacing" DICOM tag (0028,0030) and is being used to determine the physical distance in the object space. Pixel spacing of 1 mm implies measurement accuracy of +/- 0.5 mm. Similarly, for projective modalities, if DICOM Presentation Size Mode is set to TRUE SIZE Imager Pixel Spacing (0070,0100) can be used to estimate the size of the object. The actual estimate of accuracy will vary depending on the modality type and the specifics of the imaging protocol.

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Measurement	Unit of Measure	Precision
Length (Ruler)	millimeters (mm)	1/10 of a unit (i.e., 0.1 mm, if in millimeters)
Angle (Angle tool and Cobb measurements)	Degrees	Whole numbers as in 1 unit, (i.e., .45 degrees)
Area (ROI Circle, ROI Freehand, ROI Ellipse)	cm^2	< 10 - 1.1234 < 100 - 11.123 < 1000 - 111.12 < 10000 - 1111.1 >= 10000 will be whole numbers
Brightness ((ROI Circle, ROI Freehand, ROI Ellipse, Point Value Tool)	Hounsfield units for CT; grayscale units for others	Density: 1/100 of a unit (i.e., 1.00) Standard Deviation: whole numbers as in 1 unit

13.2.2 Order of Precedence

IntelliSpace PACS uses the following order of precedence for the pixel spacing for measurements and image display (in the case of non-square pixels) for Projection Radiography modalities:

SOP Classes	Modality
1.2.840.10008.5.1.4.1.1.1	CR
1.2.840.10008.5.1.4.1.1.1.1	DX
1.2.840.10008.5.1.4.1.1.1.2	MG
1.2.840.10008.5.1.4.1.1.1.2.1	MG Unprocessed
1.2.840.10008.5.1.4.1.1.1.3	IO
1.2.840.10008.5.1.4.1.1.12.1	XA
1.2.840.10008.5.1.4.1.1.12.1.1	Enhance XA
1.2.840.10008.5.1.4.1.1.12.2	XRF
1.2.840.10008.5.1.4.1.1.12.2.1	Enhance XRF

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Note the following:

- IntelliSpace PACS uses the calculated pixel spacing values if the image was manually calibrated using the IntelliSpace PACS Image Calibration tool.
- IntelliSpace PACS uses calibrated pixel spacing tag (0028,0030) if present and different than tag (0018,1164) or if (0018,1164) is not present.
- IntelliSpace PACS uses the imager pixel spacing (0018,1164) divided by the estimated radiographic magnification factor (0018,1114), if both are present and the value of 18,1114 is not 1, 0.
- IntelliSpace PACS uses the imager pixel spacing (0018,1164) if present
- IntelliSpace PACS displays measurements in pixels

For all other modalities, the following applies:

- IntelliSpace PACS uses the calculated pixel spacing values if the image was manually calibrated using the IntelliSpace PACS Image Calibration tool.
- IntelliSpace PACS uses calibrated pixel spacing tag (0028,0030) if present.
- IntelliSpace PACS displays measurements in pixels.
- For US images only,
  1.2.840.10008.5.1.4.1.1.6.1US Single Frame
  1.2.840.10008.5.1.4.1.1.3.1US Multiframe
  IntelliSpace PACS uses the US region calibration values 0018,602c and 0018,602e for pixel spacing.

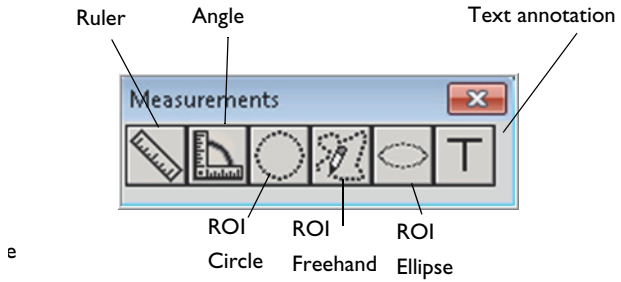
13.3 Using the Measurement Palette

WARNING

Measurement values are modality dependent. The measurement values that IntelliSpace PACS displays are derived from information sent by the modality responsible for generating the image being measured. If this modality is incorrectly configured or defective, IntelliSpace PACS measurement values may be adversely affected and may be incorrect.

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IntelliSpace PACS provides a **Measurement** palette that streamlines your work and allows you to make various measurements and the text annotation on an image. You can drag the **Measurement** palette to any location on your screen. You can also toggle the display of the palette by pressing **M**. The **Measurement** palette displays for the exam until you close the palette.



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Figure 13.1 Measurement Palette

You can define keyboard shortcuts for the tools on the **Measurement** palette that set whether or not the tool remains active (persists) after you use it on an image. See 'Keyboard Commands' (see page 407).

1. Right-click on an image and from the menu, select **Measurements**, then **Measurement Palette**. The **Measurement** palette displays.
2. Do one of the following:
   - To use a tool once, click the icon for the tool you want to use.
   - To use the tool more than once, double-click the icon for the tool you want to use.

   The cursor changes to a cross-hair when a measurement tool is being used.
3. Click the **Close** icon to close the **Measurement Palette**.

13.4 Clearing Measurements and Annotations

- Right-click on an image and from the menu, select **Delete all Measurements and Annotations**.

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- To clear an individual measurement or annotation, select it, right-click, and select **Delete**.

13.5 Viewing Existing Measurements and Annotations

If other users have previously made measurements or annotations on the image, these existing measurements and annotations are not shown at initial image display.

Since measurements and annotations are saved in presentation states, you can display the existing measurements or annotations by selecting existing presentation states. Right-click in the Exam Margin and from the menu, select **Presentation State** and then click on one of the available presentation states.

13.6 Using the Ruler Tool

You can use the **Ruler** tool to make linear measurements to, for example, measure the diameter of a tumor as a baseline prior to treatment, or measure the diameter of the appendix to diagnose acute appendicitis.

The measurement units for the **Ruler** tool are MM units if pixel spacing is specified in the DICOM tags. Otherwise, it is in pixels. The level of accuracy is to tenths of a unit.

1. Right-click on the image and from the menu, choose one of the following;
   - **Measurements**, then **Ruler**
   - **Measurement palette**, then the **Ruler** icon
2. Click on the point from which you want to measure, and either move the cursor to the second point and click, or drag the cursor to the second point. The value next to the line indicates the length of the span in millimeters or pixels, depending on the available DICOM information.
3. To edit an endpoint, select the line, then select the endpoint and drag it to the desired point on the image.

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4. To move the line, select the middle of the line and drag it to the desired location.
5. To move the label, select it and drag it to the desired location.

The following set of figures shows the various actions you can take using the **Ruler** tool. When you use the ruler tool to measure an image, a letter displays next to each measurement. This allows you to place the measurement display anywhere in the image. This naming convention is image-specific, meaning that you can have an "A", "B", or "C" in different images. The letters are preserved in a presentation state.

- Figure 1: Measure a region with the ruler.
- Figure 2: Select and drag the entire ruler without repositioning either end.
- Figure 3: Reposition either end of the ruler by clicking and dragging on an endpoint.
- Figure 4: Reposition the measurement value by clicking it and dragging to the desired position.

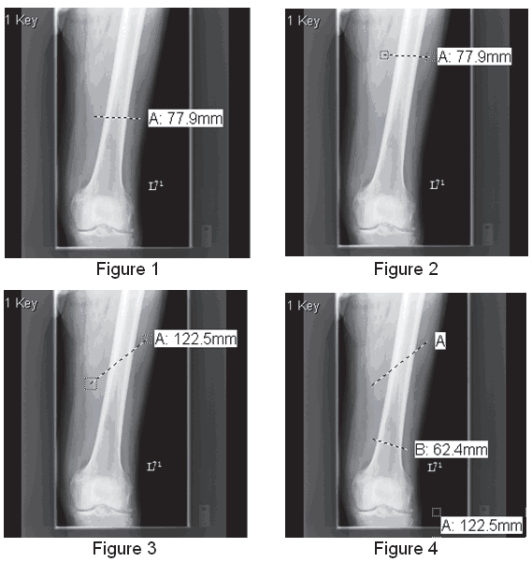


Figure 13.2 Ruler Tool example

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13.7 Using the Angle Tool

You can use the **Angle** tool to measure the angular alignment of two objects.

The measurement units for the **Angle** tool are degrees. The level of accuracy is based on the angle being computed as a floating point value and truncated to an integer. This implies a maximum angular error of approximately 0.5 degrees.

1. Right-click on the image and from the menu, choose one of the following;
   - **Measurements**, and then **Angle**
   - **Measurement Palette**, then the **Angle** icon
2. Click on the point you want to use for the angle's endpoint and move the cursor to the second point (the angle's apex) and click again.
3. Move the cursor to the second endpoint and click. The angle is complete and a box in the angle indicates the measurement of the angle in degrees.

The following set of figures shows the various actions you can take using the **Angle** tool:

- Figure 1: Create the angle by clicking on the point you want to serve as the angle's endpoint, moving the cursor to the second point (the angle's apex), clicking again, and moving the cursor to the other endpoint and clicking again.
- Figure 2: Move the entire angle without repositioning either endpoint by clicking on the apex and dragging it to the new location.
- Figure 3: Reposition either end of the angle tool by clicking on that end and dragging it to the new location. This enables you to measure wide angles where the apex is not on the image.
- Figure 4: Articulate the arms of the angle by clicking anywhere on them and dragging them to a new location.

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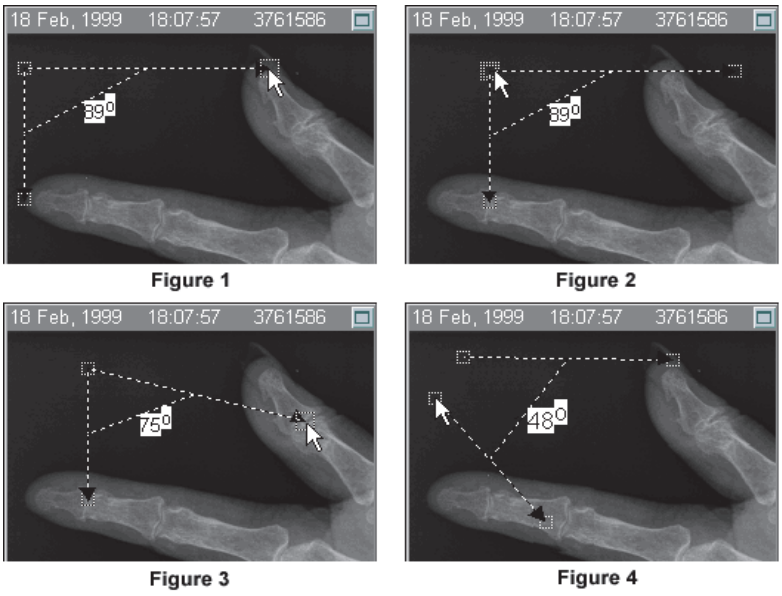


Figure 13.3 Angle Tool example

13.7.1 Taking Cobb Measurements

Cobb measurements are in degrees, and the limits of accuracy are the same as the canonical angular measurements.

1. Right-click on the image and from the menu, choose one of the following;
   - **Measurements**, and then **Angle**
   - **Measurement Palette**, then the **Angle** icon
2. Click on the point you want to use for the angle's endpoint and move the cursor to the second point (the angle's apex) and click again.
3. Move the cursor to the second endpoint and click. Notice that when the angle measurement is complete, each end of the angle lines is active, indicated by the small squares at the ends of the lines.
4. Select either part of the line to move and separate the point of the angle.

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5. Move the upper portion of the angle measurement line to represent a parallel line, with the superior aspect of the uppermost vertebrae to be measured.
6. Move the lower line to represent a parallel line with the inferior aspect of the lower vertebrae to be measured. This angle measurement is the Cobb angle measurement.

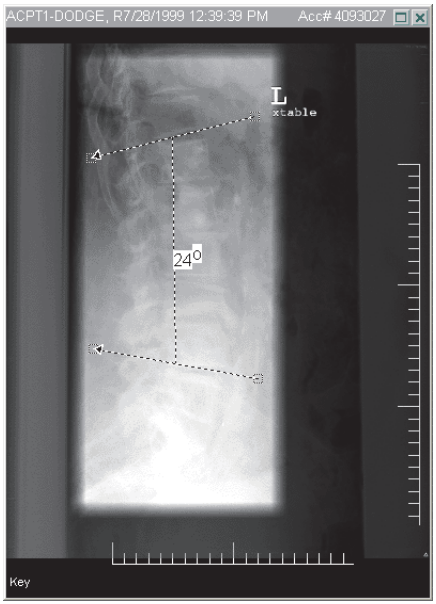


Figure 13.4 COBB Measurement Tool

13.8 Using the ROI Circle Tool

You can use the Region of Interest (ROI) Circle tool to measure the average data value for a circular region of an image.

The measurement units of the ROI Circle tool are determined by the modality. For example, with CT the pixel intensity represents Hounsfield units. For other modalities in the IntelliSpace PACS system, the pixels represent intensity. The units used are explicitly displayed, or in the case of pixels, left blank. Standard deviation is unitless and is a standard statistical measure of the dispersion of the values in the region of interest. The area

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measurement is CM^2, if pixel spacing is available; otherwise the units are pixels^2. The values for these measurements are computed in floating point and displayed so that the ROI measurement is presented to two decimal places. This means that the accuracy is dependent on the magnitude of the values in the region. The area is accurate to approximately 1 part in 10^5. The standard deviation is displayed to one decimal place, which means that the accuracy is dependent on the magnitude of the data.

For Region of Interest (ROI), the standard deviation is calculated by using the intensities of all pixels that are inside the ROI. If the image has slope/intercept, that is applied and then the standard deviation is calculated. Otherwise, the raw pixel data is used to find the standard deviation. This means that changing WW/WL will not change the measurement and that all pixels within the ROI are considered.

WARNING

Note the following:

- ***When performing an ROI measurement on an image that is displayed with a resolution smaller than the actual image (for example, an image in the rack for CT), IntelliSpace PACS may calculate the ROI using a sub-sample of the original image data. The value in this case is an accurate representation of the average measured pixel values represented by the interpolated sub-sampled image. This is a close approximation to the original pixel values.***
- ***When IntelliSpace PACS calculates a measurement using a sub-sample of an image, the measurement result is displayed with a "~" (meaning approximate value) in front of it.***
- ***When opening and displaying an image in full resolution, the ROI measurement values are recalculated. The "~" sign is no longer displayed, and there might be a small update/change from the measurement values displayed initially.***

1. Right-click on the image and from the menu, choose one of the following:
   - **Measurements**, and then **ROI Circle**
   - **Measurement Palette**, then the **ROI Circle** icon
2. Click on a point from which you want to measure and drag the cursor to include the region you are interested in (see Figure 1). The region is delineated by a circle, and ROI values next to the region indicate its mean,

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standard deviation (sd), and its area in centimeters squared, or (for a CT image) indicate its Hounsfield units, standard deviation, and area in centimeters squared.

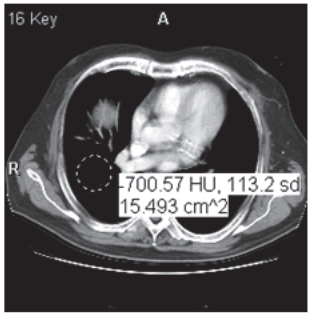


Figure 1

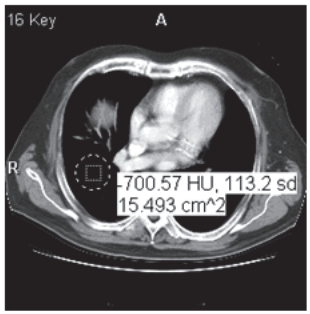


Figure 2

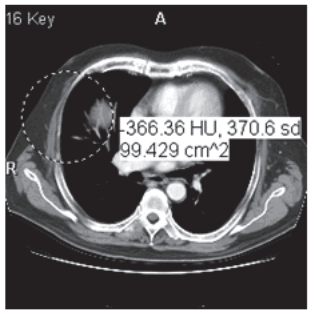


Figure 3

Figure 13.5 ROI Circle Tool example

3. To move the entire region without altering its size, click on the ROI center and drag the region to the desired location (see Figure 2).
4. To resize the region, click and drag the circle's perimeter (see Figure 3).

13.9 Using the ROI Freehand Tool

You can use the Region of Interest (ROI) Freehand tool to measure the average data value for a non-circular region of an image. The units and accuracy are identical to the ROI Circle tool.

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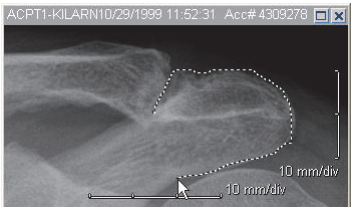
For Region of Interest (ROI), the standard deviation is calculated by using the intensities of all pixels that are inside the ROI. If the image has slope/intercept, that is applied and then the standard deviation is calculated. Otherwise, the raw pixel data is used to find the standard deviation. This means that changing WW/WL will not change the measurement and that all pixels within the ROI are considered.

WARNING

Note the following:

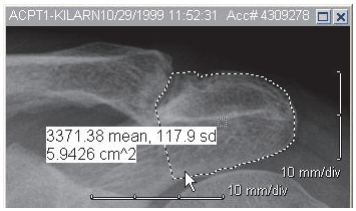
- ***When performing an ROI measurement on an image that is displayed with a resolution smaller than the actual image (for example, an image in the rack for CT), IntelliSpace PACS may calculate the ROI using a sub-sample of the original image data. The value in this case is an accurate representation of the average measured pixel values represented by the interpolated sub-sampled image. This is a close approximation to the original pixel values.***
- ***When IntelliSpace PACS calculates a measurement using a sub-sample of an image, the measurement result is displayed with a "~" (meaning approximate value) in front of it.***
- ***When opening and displaying an image in full resolution, the ROI measurement values are recalculated. The "~" sign is no longer displayed, and there might be a small update/change from the measurement values displayed initially.***

1. Right-click on the image and from the menu, choose one of the following;
   - **Measurements**, and then **ROI Freehand**
   - **Measurement Palette**, then the **ROI Freehand** icon
2. Click and drag the cursor to enclose the desired area. The shape of your outline can be as complex as necessary, but the lines cannot intersect. When you release the mouse, the start and end points are automatically connected and the ROI values are displayed.

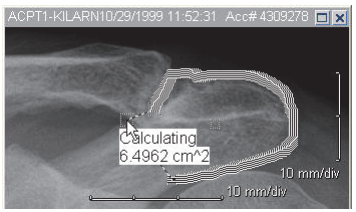


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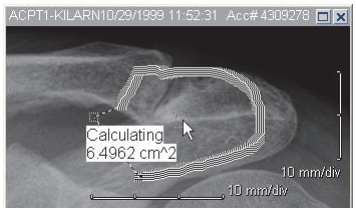
3. Release the mouse button when you have finished the outline. The **ROI Freehand** tool automatically connects the first and last points. The enclosed area of the outline is displayed in centimeters squared or Hounsfield units for CTs.



4. Select any portion of the outline and drag to adjust the outline's contours.



5. Drag the outline to any part of the image by clicking on the center box and dragging to the desired location.



13.10 Using the ROI Ellipse Tool

You can use the Region of Interest (ROI) Ellipse tool to measure the average data value for an elliptical region of an image. The units and accuracy are identical to 'Using the ROI Circle Tool' (see page 269).

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For Region of Interest (ROI), the standard deviation is calculated by using the intensities of all pixels that are inside the ROI. If the image has slope/intercept, that is applied and then the standard deviation is calculated. Otherwise, the raw pixel data is used to find the standard deviation. This means that changing WW/WL will not change the measurement and that all pixels within the ROI are considered.

WARNING

Note the following:

- ***When performing an ROI measurement on an image that is displayed with a resolution smaller than the actual image (for example, an image in the rack for CT), IntelliSpace PACS may calculate the ROI using a sub-sample of the original image data. The value in this case is an accurate representation of the average measured pixel values represented by the interpolated sub-sampled image. This is a close approximation to the original pixel values.***
- ***When IntelliSpace PACS calculates a measurement using a sub-sample of an image, the measurement result is displayed with a "~" (meaning approximate value) in front of it.***
- ***When opening and displaying an image in full resolution, the ROI measurement values are recalculated. The "~" sign is no longer displayed, and there might be a small update/change from the measurement values displayed initially.***

1. Right-click on the image and from the menu, choose one of the following;
   - **Measurements**, and then **ROI Ellipse**
   - **Measurement Palette**, then the **ROI Ellipse** icon in the Measurements toolbar
2. Click on a point from which you want to measure and drag horizontally to include the region you are interested in. The region is delineated by an ellipse, and ROI values next to the region indicate its mean, standard deviation (sd), and its area in centimeters squared.
3. To resize the region, click and drag the side handles.
4. To rotate the region, click and drag the corner handles.
5. To move the entire region without altering its size, click within the ROI and drag the region to the desired location.

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13.11 Using the Point Value Tool

The **Point Value** tool allows you to measure the value of data points at a specific point on the image. This feature gives the luminance value for single pixels of the original DICOM image. In other words, the value given is not related to what is being displayed on your screen. Rather, it is the value for a reference point which is mapped to the original DICOM image. The x value starts at zero (left side of image) and increases to the maximum value at the right side. The y value starts at zero (at the top of the image) and increases as you move the cursor toward the bottom of the image.

The measurement units depend on the modality type and the information provided in the DICOM image header, and will be either:

- Hounsfield units (sloped/intercept) for CT
- Mapped pixel intensity for VOI LUT
- Pixel intensity, as remapped by modality LUT or rescale slope/intercept processing as per DICOM standard

The level of accuracy is the following:

- True pixel value, no error for untransformed data
- Hounsfield units based on -1024 air as per DICOM standard, no error
- If slope/intercept is provided, then the pixel value is Y = mx +b, with floating point values rounded to the integer pixel value. This means that the error is dependent on the magnitude of the value, with a maximum deviation of +/-0.5.

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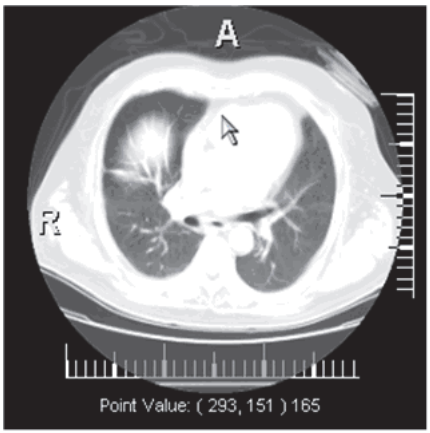


Figure 13.6 Point Value Tool example

WARNING

Note the following:

- ***When IntelliSpace PACS calculates a measurement using a sub-sample of an image, the measurement result is displayed with a "~" (meaning approximate value) in front of it.***
- ***When opening and displaying an image in full resolution, the Point value measurement values are recalculated. The "~" sign is no longer displayed, and there might be a small update/change from the measurement values displayed initially.***

1. Right-click on the image and from the menu, choose **Measurements**, and then **Point Value**. Screen overlay text labeled "Point Value" is displayed at the bottom of the image, followed by the x and y coordinates and a number that changes as you move the cursor over the image.
2. Click the image to disable the **Point Value** display.

13.12 Calibrating Images

The **Calibrate Image** tool allows you to calibrate the image on your screen for certain known measurements. You cannot use this tool with images that have valid DICOM-defined pixel spacing. Also, note that using the **Calibrate Image** tool on an image that has already been calibrated changes

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the measurement values for that image and displays a warning message. If the calibrate selection is gray, the system has received correct DICOM header information to automatically calibrate the measure distance tool.

1. Right-click the image and from the menu, select **Measurements**, and then **Calibrate Image**.
2. Place your cursor at the end-point of a known distance and drag to the end of the known distance.
3. Release the mouse button. The **Image Calibration** dialog box displays.
4. Enter the length of the known distance in millimeters and click **OK**. From now on, all measurements of distance and area are based on the newly defined scale. Also, the interactive scaled rulers are resized.

13.13 Taking Ultrasound Measurements

You can use IntelliSpace PACS to take length measurements on Ultrasound-B-Mode images. Measurements on Spectral, M-Mode, or Dual-B-Mode images are not supported. For these images, you can use the **Calibrate Image** tool to manually calibrate the images. See 'Calibrating Images' (see page 276).

There are a few instances when measurements on ultrasound images might not be possible. For example, the scanner might not send IntelliSpace PACS the calibration information needed for the measurements.

13.14 Annotating Images

The **Text Annotation** tool is a quick and useful way to annotate images with shapes or text. For example, you can use annotations to document marker lesions for cancer trials. Annotations can make it easier for a clinician to interpret the image.

You can apply several annotation styles, including line, circle, arrow, triangle, text and freehand, as well as custom annotation styles. Note that you cannot use the annotations, measurement tools, and the **Localizer** tools at the same time. System Administrators can create and personalize annotation styles. See

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'Setting Annotation Preferences' (see page 362). Pre-defined annotations include: Bleed, Calcification, Cyst, Foreign Body, Fracture, Free Air, Mass, Node, Stone, and Tear.



Figure 13.7 Annotation Tool example

CAUTION ***IntelliSpace PACS stores data in the fashion that it was received. Annotations and other changes are saved in presentation states and are available for subsequent viewers of these images within IntelliSpace PACS but the changes are not preserved when these are exported back to another DICOM device. This means that if you want to make permanent changes to any image, you need to do this on the modality itself and then send the image back to IntelliSpace PACS. Right-click the image or series you wish to annotate. Note the following:***

- ***Annotations can be hidden, removed, or deleted from the screen.***
- ***Presentation States do not export via DICOM export back to the modality.***
- ***When printing, the Print Measurements and Annotations option must be selected.***

1. From the menu select **Annotations**, then the tool you want to use (for example, **Triangle**).
2. Click the part of the image where you want the annotation to start and drag to draw the selected shape.
3. Release the mouse button to complete the annotation.

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4. To change the line style of the annotation, right-click the annotation and from the menu, select **Edit Line Style**. The **Edit Line Style** dialog box displays. Select the desired line style and click **OK**.

13.14.1 Adding a Text Annotation

1. Right-click the image or series you wish to annotate.
2. Do one of the following from the image menu:
   - Select **Annotations**, then **Text**.
   - Select **Measurement**, then **Measurement Palette**, then click the **T** icon.
3. Type your annotation into the textbox.
4. To change the font of the text annotation, right-click the text and from the menu, select **Edit Font**. The **Edit Font** dialog box displays.
5. Select the desired font and size and click **OK**.

CAUTION ***When a text annotation is exported as a GSPS file, a 3rd party application might display the text at a different position and size. The DICOM standard does not strictly specify how a text annotation should be displayed, so each application can have its own interpretation. To point to a specific section of the image use the Arrow tool or create the text annotation with an arrow using Preferences / System Preferences / Annotations.***

13.14.2 Moving an Annotation

- Click anywhere on the annotation and drag it to the desired location.

13.14.3 Editing an Annotation

1. Double-click on the annotation. The **Text Annotation** dialog box displays, displaying the annotation.
2. Edit the annotation as desired.
3. Click **OK**.

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13.15 Spine Labeling

You can use the **Spine Labeling** tool to place markers at each vertebra or vertebral disc. You can save labels when you save the configuration as a Presentation State.

You would typically use this tool for an MR series to label the vertical bodies of a sagittal image and then turn on the **Scout** tool. You could then quickly determine the vertebral body you are looking at when you cine through an axial stack.

NOTE ***The Spine Labeling tool should only be used on Sagittal or Coronal images.***

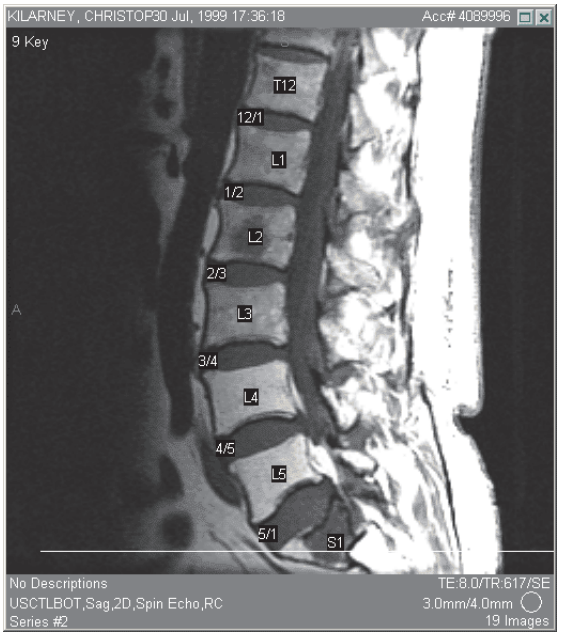


Figure 13.8 Spine Labeling Tool example

1. Right-click the series you wish to label.
2. From the menu, select **Annotations**, then **Spine Labeling**. The **Spine Label Panel** dialog box displays. For an MR stack, IntelliSpace PACS automatically sets the stack to the middle slice in the stack.

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3. Do one of the following. Note that spinal labels L6 and T13 are not included in automatic labeling, but can be chosen manually from the **Spine Label Panel** dialog box.
   - Click on the desired label in the dialog box, then click the location in the image where you wish the label to be placed.
   - Highlight the label that you wish to begin with and begin clicking on the image.
   - Select the **Descending order** check box to change the order of automatic labeling. When unchecked, the labeling is in ascending order.
   - Click **Show All** or **Hide All** to show or hide all labels.
4. To remove an individual label, select it and click **Delete**. To remove all labels, click **Delete All**.

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14 Philips IntelliSpace Clinical Applications

14.1 Overview

Philips IntelliSpace Clinical Applications is an image processing workstation software package designed to run on standard PC hardware. The hardware required is made up of "off-the-shelf" standard computer components. Philips IntelliSpace Clinical Applications software receives image data from medical scanning devices, such as CT and MRI, or from image archives. Philips IntelliSpace Clinical Applications performs viewing, image manipulation, communication, printing, and quantification of images.

Philips IntelliSpace Clinical Applications include the following applications:

- IntelliSpace Volume Vision
- IntelliSpace CT Colonography
- IntelliSpace CT Pulmonary Embolism Assessment
- IntelliSpace CT/MR Vessel Explorer

IntelliSpace Volume Vision is the 2D/3D/4D enhanced viewing application part of the IntelliSpace PACS Clinical Applications R8.2, bundled with the comprehensive IntelliSpace PACS solution.

IntelliSpace CT Colonography (CT Colonography), IntelliSpace CT Pulmonary Embolism Assessment (CT Pulmonary Embolism Assessment), and IntelliSpace CT/MR Vessel Explorer (CT/MR Vessel Explorer) are applications for specific types of viewing. Note that these three clinical applications are sold separately and require a license. If you do not have a license for one or more of these three clinical applications, the entries will not appear under Philips Applications when you right-click the IntelliSpace PACS canvas.

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14.2 About IntelliSpace Volume Vision

IntelliSpace Volume Vision (Volume Vision) adds real time 3D functionality (MIP, MPR and Volume Rendering). Once Volume Vision is installed, you can access these tools by right-clicking on a thumbnail image in the IntelliSpace PACS Exam Rack or in an image pop-up window and selecting one of the following options:

- **MIP** (Maximum Intensity Projection): The maximum voxel value encountered along each ray is displayed on the projection plane (plane of the monitor). MIP is commonly used for vascular studies and 3D rotational angiography.
- **MPR** (Multi-Planar Reformation): A post-processing technique which produces new slices from a stack of images. The original images are stacked one on top of the other. MPR then produces a reconstructed plane of the anatomy in any desired orientation. When an MPR slice is widened, it becomes a slab. The result is then identical to an average intensity projection.
- **Volume Rendering**: Volumes are derived via a post-processing technique, which uses complex virtual ray methods to produce three-dimensional objects from a stack of images. The original images are stacked one on top of the other. A classification is applied to visualize a selected surface within the volume.

The MPR/MIP toolset includes:

- Real Time Interactive orthogonal, oblique and double-oblique cuts
- Curved MPR with intelligent task guidance
- Interactive slab thickness adjustments
- Side by side MPR/MIP for current and prior exams
- Triangulation (linked cursors)
- Window/Level presets, Zoom/Pan, interactive edge enhancement
- Measurement tools (distance, (open) angle, points, profile, free contour, vessel diameter)

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Volume Rendering includes:

- High resolution shaded volume rendering technique
- Standard views and interactive rotations
- Predefined 3D classification gallery
- Interactive classification (opacity threshold and color) adjustment
- Interactive slab thickness adjustment (quick segmentation)
- MPR or MIP reference images (with linked cursors)
- 3D Measurement tools (same as above plus multi-slice contours)

NOTE ***Patient data that has been anonymized in IntelliSpace PACS is not anonymized in Volume Vision or third-party applications. Also, printing is not supported in Volume Vision. As a workaround, you may have to do a secondary capture of the MPR, send data back to IntelliSpace PACS, then print.***

14.2.1 Starting Volume Vision

When you view images in IntelliSpace PACS with Volume Vision, image and metadata are transferred from IntelliSpace PACS to Volume Vision, and Volume Vision is displayed on top of IntelliSpace PACS. A progress bar displays as the image is being transferred.

NOTE: ***Volume Vision does not support any printing. As a workaround, you can do a secondary capture of the MPR, send data back to IntelliSpace PACS, and then print from IntelliSpace PACS.***

To open one or more series, do the following:

1. In the IntelliSpace PACS Exam Rack, select one or more series: press and hold **Shift** and click on the thumbnails.
2. Right-click on one of the selected thumbnail images and select one of the following options:
   - **MPR** (Multi-Planar Reformat)
   - **MIP** (Maximum Intensity Projection)
   - **Volume rendering**

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3. Volume Vision starts.
4. Use the tools available in Volume Vision. Refer to the Volume Vision online help for detailed information on the available features.

Alternatively, you can open a complete exam in Volume Vision.

1. In the IntelliSpace PACS exam rack, right-click on the **Exam Margin** and select **Volume Vision**.
2. Volume Vision starts.

NOTES

- ***Volume Vision supports only the following image types: CR, CT, CX, DR, DX, MG, MR, RF, US, XA, and SC. Other image types are not supported.***
- ***Scanned documents are not loaded in Volume Vision.***
- ***If the system does not have enough memory to load all images, Volume Vision displays a warning message that you must set a volume of interest that fits into memory. See the Volume Vision online help for more information.***

WARNING

- ***If you modified the images in the IntelliSpace PACS environment, these modifications will not be available in Volume Vision.***
- ***In Volume Vision, in combination with IntelliSpace PACS Enterprise, all modifications are available only during the current session. When you exit Volume Vision and return to the IntelliSpace PACS environment, all your work is lost.***
- ***To store the results of your work as photos, use the Capture tool in Volume Vision. See the Volume Vision online help for more information.***
- ***You can also use the Capture tool to save the results of MIP, MPR, and Volume rendering, so that your work can be restored and reused during any future session of Volume Vision. In addition, you can save movies as originals, photos, or AVI files. See the Volume Vision online help for more information.***
- ***In Volume Vision, in combination with IntelliSpace PACS Radiology, all modifications on volume objects are stored and available in the next session of Volume Vision.***

14.2.2 Hold and Resume Volume Vision Sessions

Patient data displayed in Volume Vision always corresponds to the patient displayed on the IntelliSpace PACS canvas.

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Therefore, if you select another patient in IntelliSpace PACS while the Volume Vision session is still open, Volume Vision will become iconized and the session will be temporarily locked. You can access that Volume Vision session again only when you select the corresponding patient in IntelliSpace PACS.

You can also choose to temporarily preserve a specific session of Volume Vision:

- From within Volume Vision, from the **Session** menu, select **Hold**.

14.2.3 Exiting Volume Vision

To exit Volume Vision and return to IntelliSpace PACS, do one of the following:

- To exit Volume Vision and save the reconstructed image back to the IntelliSpace PACS server, use the **Capture** tool in Volume Vision.
- To save the work you are doing on the image in Volume Vision and return to it later in the IntelliSpace PACS session, from within Volume Vision, select **Session**, then **Hide**.
- To exit Volume Vision and return to IntelliSpace PACS, from the **Session** menu, select **Exit**.



WARNING

- ***In Volume Vision, in combination with IntelliSpace PACS Enterprise, all modifications are available only during the current session. When you exit Volume Vision and return to the IntelliSpace PACS environment, all your work is lost.***
- ***To store the results of your work as photos, use the Capture tool in Volume Vision. See the Volume Vision online help for more information.***
- ***You can also use the Capture tool to save the results of MIP, MPR, and Volume rendering, so that your work can be restored and reused during any future session of Volume Vision. In addition, you can save movies as originals, photos, or AVI files. See the Volume Vision online help for more information.***
- ***In Volume Vision, in combination with IntelliSpace PACS Radiology, all modifications on volume objects are stored and available in the next session of Volume Vision.***

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NOTE ***When you exit IntelliSpace PACS, you also exit from Volume Vision.***

14.3 Analysis

NOTE ***Depending on your licenses and the type of images that you've selected for analysis, some of the analysis options may be disabled.***

1. From within Volume Vision, select one or more views to be analyzed.
2. On the main menu bar, click **Analysis** and then point to the required analysis type. See the following table for the available analysis types.

Application Icon	Analysis Types
	Philips IntelliSpace CT Colonography See 'Philips IntelliSpace CT Colonography' (see page 289)
	Philips IntelliSpace CT Pulmonary Embolism Assessment See 'Philips IntelliSpace CT Pulmonary Embolism Assessment' (see page 291)
	Philips IntelliSpace CT/MR Vessel Explorer See 'Philips IntelliSpace CT/MR Vessel Explorer' (see page 293)

3. A new screen with the selected application is displayed.
4. Click the **Exit** button in the application to return to the main viewing window.

- OR -

1. In the IntelliSpace PACS exam rack, right-click the image, select **Philips Applications**, and then select the required analysis type. See the preceding table for the available analysis types.
2. A new screen with the selected application is displayed.
3. Click the **Exit** button in the application to return to the IntelliSpace PACS exam rack. The images in the exam rack are updated with the results of your work.

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14.4 Philips IntelliSpace CT Colonography

Philips IntelliSpace CT Colonography (CT Colonography) is an application that supports you in the detection of polyps in the colon.

The application is designed to work on CT scans acquired with CT Colonography scanning protocols. The CT scan should contain at least 30 images.

CT Colonography supports primary 2D or primary 3D hanging protocols for inspection of the colon. You can do either of the following:

- Detect lesions in the original grey scale images with a reference link to a 3D image.
- Inspect the surface of the colon wall in a primary 3D environment with reference links to grey scale images.

In both environments, it is possible to do a comparison reading of matched series such as supine and prone or previous and current.

14.4.1 Starting CT Colonography

NOTE ***If the selected series are not suitable for CT Colonography, Volume Vision opens instead of CT Colonography.***

1. In the IntelliSpace PACS exam rack, select one or two abdomen scans: press and hold **Shift** and then click the thumbnail images.
2. Right-click one of the thumbnail images, select **Philips Applications**, and then select **CT Colonography**.

   - OR -

1. In the IntelliSpace PACS exam rack, select one or two abdomen scans: press and hold **Shift** and then click the thumbnail images.
2. Start Volume Vision. See 'Starting Volume Vision' (see page 285).
3. In the main menu, click **Analysis** and then click **CT Colonography.** The default CT colon hanging protocol is applied to the selected data. See 'Analysis' (see page 288).

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4. Alternatively: Apply a CT colon hanging protocol. Do one of the following:
   - In the main menu, click **Protocols** and then click **Hanging protocols**.
   - Click the **Hanging protocols** button on the main toolbar.

For more information about CT Colonography, see the Philips IntelliSpace Clinical Applications online help.

When CT Colonography is started:

- the CT colon hanging protocol is applied to the selected data
- dedicated classifications are applied to the views
- the colon is automatically segmented
- a path through the colon is automatically generated

14.4.2 Closing CT Colonography

To close CT Colonography, from the main menu, click **Session** and then click **Exit**.

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14.5 Philips IntelliSpace CT Pulmonary Embolism Assessment

Philips IntelliSpace CT Pulmonary Embolism Assessment (CT Pulmonary Embolism Assessment) is a postprocessing application for use in viewing, assessing and reporting computed tomography (CT) thorax studies. The optimized visualizations of CT Pulmonary Embolism Assessment, comprised of linked MPR views, are intended to support Radiologists and referring Physicians in localizing and reporting on lung emboli.

CT Pulmonary Embolism Assessment can be used for rapid risk assessment in patients with suspected acute pulmonary embolism. The assessment includes the possibility of measuring the ratio of the ventricular dimensions.

Evidence from scientific studies suggests that there is a relationship between right ventricular enlargement and prognosis of the patient.

14.5.1 Starting CT Pulmonary Embolism Assessment

1. In the IntelliSpace PACS exam rack, select one or more series: press and hold **Shift** and then click the thumbnail images.
2. Right-click the image, select Philips Applications, and then select Pulmonary Embolism Assessment.

NOTE ***If the selected series are not suitable for CT Pulmonary Embolism Assessment, Volume Vision opens instead of CT Pulmonary Embolism Assessment.***

- OR -

1. In the IntelliSpace PACS exam rack, select one or more series: press and hold **Shift** and then click the thumbnail images.
2. Start Volume Vision. See 'Starting Volume Vision' (see page 285).
3. On the main menu, click **Analysis**, and then click **Pulmonary Embolism Assessment**. See 'Analysis' (see page 288).

The default hanging protocol of CT Pulmonary Embolism Assessment, for your hardware setup, is applied to the scan. The Main axial and orthogonal MPR zoomed views are created.

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All views are MPRs. The application requires complete original CT scans (no missing slices) with a minimum of 30 slices and a maximum slice thickness of 2 mm to present all views. Visualization is possible with slice thickness greater than 2 mm.

When you start CT Pulmonary Embolism Assessment, the hanging protocol used depends on the following criteria:

- The selected scan (dataset) or scans.
- Your user profile (permissions).
- The default hanging protocols.

  The automatically applied default hanging protocol depends on

  - The number of monitors on your reading station
  - A weight factor that prioritizes protocols matching the same criteria

  See the Philips IntelliSpace Clinical Applications online help for an overview of the standard hanging protocols available for CT Pulmonary Embolism Assessment.
- Specific actions for CT Pulmonary Embolism Assessment that are automatically applied:
  - The application automatically detects the lungs and displays the main axial MPR view.

Once started, the name **Philips IntelliSpace CT Pulmonary Embolism Assessment** is displayed in the main toolbar.

14.5.2 Closing CT Pulmonary Embolism Assessment

To close CT Pulmonary Embolism Assessment, in the main menu, click **Session**, and then click **Exit**.

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14.6 Philips IntelliSpace CT/MR Vessel Explorer

Philips IntelliSpace CT/MR Vessel Explorer (CT/MR Vessel Explorer) is a post-processing application that supports:

- The visual inspection of vessels by simple navigation along vessel structures in CTA/MRA data acquired for the optimization of vessel visualization,
- Manual and semi-automatic measurements,
- The storage of measurements and visualizations into the form of a secondary capture series.

14.6.1 Starting CT/MR Vessel Explorer

CT/MR Vessel Explorer can be started from

- IntelliSpace PACS canvas
- Volume Vision

If you start CT/MR Vessel Explorer from a volume view in Volume Vision, any settings that you have applied to the MIP/MPR or volume rendering will be automatically taken over in the inspection view of CT/MR Vessel Explorer. This allows efficient review and analysis.

1. In the IntelliSpace PACS exam rack, right-click the thumbnail image of the series that you want to inspect, select **Philips Applications**, and then select **Vessel Explorer**.

NOTE ***If the selected series are not suitable for CT/MR Vessel Explorer, Volume Vision opens instead of CT/MR Vessel Explorer.***

- OR -

1. In the IntelliSpace PACS exam rack, right-click the thumbnail image of the series that you want to inspect, and select **Philips Applications > Vessel Explorer**.
2. CT/MR Vessel Explorer starts. The images are displayed according to the settings in the user profile.

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3. If required, prepare and modify a MIP/MPR/Volume-rendered image. Select the volume view.
4. In the main menu, click **Analysis**, and then click **Vessel Explorer**. See 'Analysis' (see page 288).

NOTE

- ***If the system does not have enough memory to load all images, CT/MR Vessel Explorer shows a warning message that you must set a volume of interest (VOI) that fits into memory. See the Philips IntelliSpace Clinical Applications online help for more information.***

For more information about CT/MR Vessel Explorer, see the Philips IntelliSpace Clinical Applications online help.

14.6.2 Closing CT/MR Vessel Explorer

To close CT/MR Vessel Explorer, click **X** on the Vessel Explorer application tab.

14.7 Configuring Automatic Startup

You can define rules in Philips IntelliSpace PACS for automatic start-up of IntelliSpace PACS Clinical Applications. These rules link exams to a clinical application. If you double-click an exam in an IntelliSpace PACS worklist, the linked application starts automatically.

A rule that links an exam to an application has the following attributes:

- Modality (required)
  Possible modalities are:
  - CR
  - CT
  - CX
  - DR
  - DX
  - MG
  - MR
  - RF
  - US

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- XA

- Application (required)
- Body part (optional)
- Exam description (optional)

NOTE ***The body part and the exam description of an exam are used as defined in the IntelliSpace PACS properties. You can find them in the 'Edit Exam' dialog box in IntelliSpace PACS. To open this dialog, right-click an exam in a worklist and select 'Edit Exam'. The body part of the exam is displayed in the 'Body Part' field. The exam description is displayed in the 'Description' field. See section 7.8 'Editing Exams' on page 110.***

The rule is applied as follows: if the modality, body part, and exam description of an exam match the modality, the body part and the exam description of the rule, the application defined in the rule starts automatically when you double-click the exam in an IntelliSpace PACS worklist.

If two or more rules match one exam, the rule with the strongest match is applied. The more attributes of a rule that are defined, the stronger the possible match of the rule is.

NOTE ***If you select two or more exams from an IntelliSpace PACS worklist, the automatic start-up only applies to the first exam.***

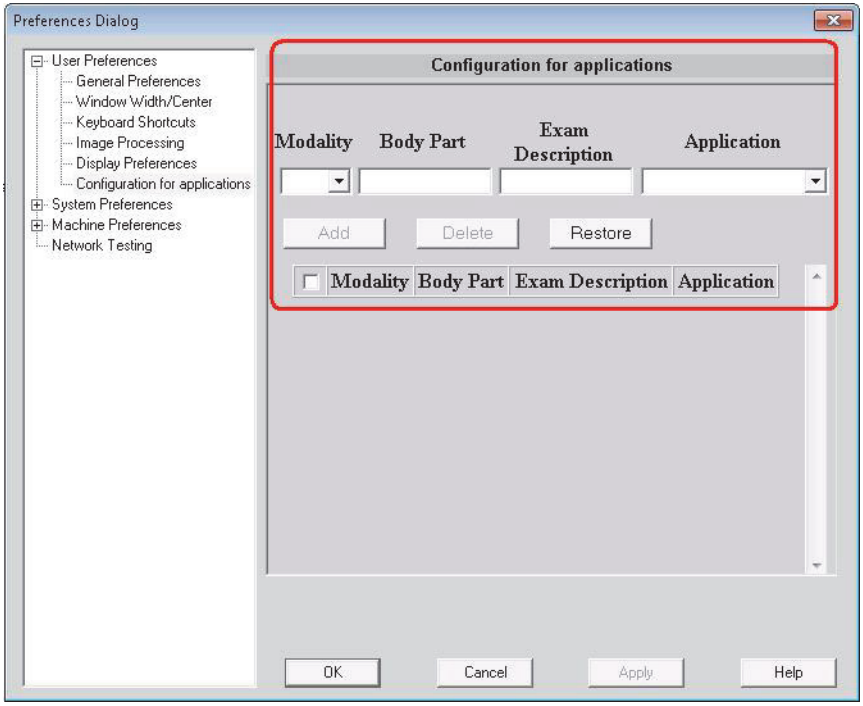
14.7.1 Adding and Deleting Rules

You can add and delete rules in the Preferences dialog in IntelliSpace PACS. To open this dialog, do the following:

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip. The Preferences dialog displays.
2. Click the **+** sign next to **User Preferences** in the Preferences dialog.

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3. Select **Configuration for Applications**. The Configuration for Applications panel displays in the right pane of the Preferences dialog.



For more information on adding and deleting rules, see section 17.7 ‘Setting Applications Configuration Rules’ on page 351.

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15 Retrieving and Exporting Studies

IntelliSpace PACS includes the following tools you can use to retrieve and export studies:

- **Media Viewer**: See 'Using the Media Viewer' (see page 297)
- **Print to Paper**: See 'Printing to Paper' (see page 302)
- **Export via DICOM**: See 'iExport for DICOM Export' (see page 303)
- **iQuery**: See 'iQuery for DICOM Study Retrieval' (see page 314)

15.1 Using the Media Viewer

WARNING

- ***Do not use CDs and DVDs as a permanent or fail-safe archive for patient data. When storing data on a CD or DVD, IntelliSpace PACS does not verify that the patient data is correctly stored and retrievable. In addition, CDs and DVDs may deteriorate over time. For long-term storage, all patient data should be stored in an archiving system (such as a PACS).***
- ***Do not diagnose from media such as CDs or DVDs.***

The **Media Viewer** allows you to export an encapsulated version of IntelliSpace PACS and the patient exams you choose to various media, including CD, DVD, USB device, and external hard drives. You can use the Media Viewer for exams with anonymous patient information. See 'Working with Anonymized Exams in the Media Viewer' (see page 301).

The patient images are all lossless (unless the IntelliSpace PACS Server received lossy images from another source). Diagnostic reports and presentation states are exported with the patient exams. Exam notes, allergies, other clinical information, and some diagnostic report fields are not exported to the CD or other media.

The **Media Viewer** provides for easy distribution but, most importantly, no internet connection is needed to view patient exams. Note that if you log out when exam links are still open in the Media Viewer, the links are lost and have to be redone when you log back into IntelliSpace PACS.

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You can burn CDs and DVDs directly from IntelliSpace PACS without having to exit the application.

NOTE ***CAD markers are not included when you copy images to a CD/DVD using the Media Viewer.***

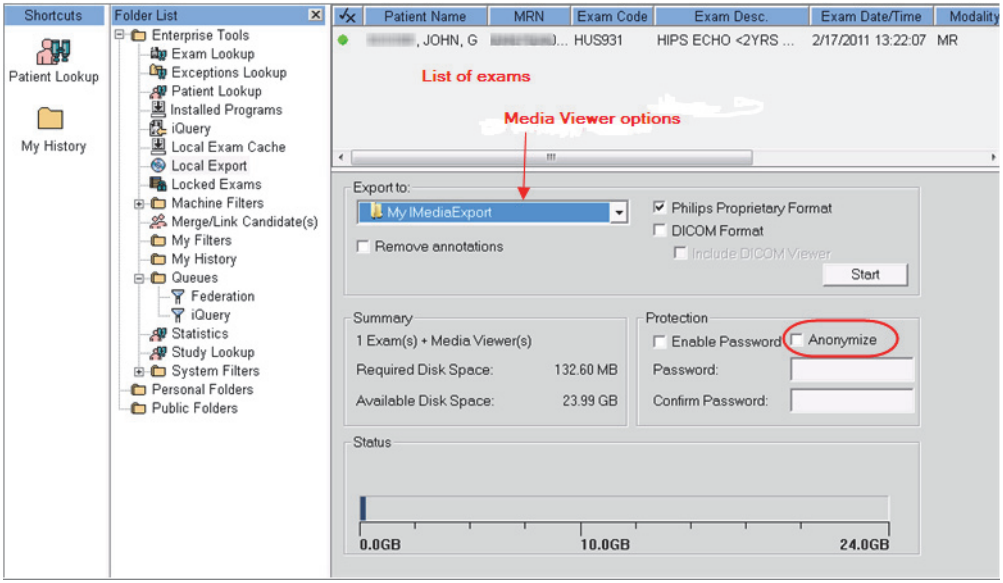


Figure 15.1 Media Viewer

15.1.1 Exporting Exams to CD or Other Media

When you select **Local Export**, the top part of the window displays the list of exams that have been added to the Local Export folder, and the bottom part contains the controls you use to export the exams.

If you drag exams that have been made anonymous into the Local Export folder, the exams copied to the CD or other media will remain anonymous. You can view and change the properties for the randomly generated patient information when the exam is listed at the top of the Media Viewer window.

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NOTE ***When burning studies to CD or other media, or viewing the images, the date/time the CD was burned will always display as the local timezone of the machine in which the CD was burned, even if the media is opened on a machine in a different time zone.***

To add exams to the **Media Viewer,** do one of the following:

- Drag exams from a filter or list of exams to the **Local Export** folder.
- On the Canvas Page, do the following:
  - Right-click an exam listed in the Patient History Timeline or an exam row margin.
  - From the right-click menu, select **Add Exam to Folder**.
  - In the Folder Dialog, **Local Export** is selected by default. Click **OK**.
  - The exam is added to the **Exam List** in the Media Viewer.

Once you have all the exams you want to export in the Exam List, do the following:

1. The default location of the exported files is C:\Documents and Settings\username\My Documents\My iMediaExport. In the **Export** list, click the arrow and choose **Browse** to navigate to a different destination or create a new folder. If you have an internal CD/DVD burner, you can choose the CD/DVD drive as the export location to save directly to a blank CD/DVD. A message displays if the selected directory is not empty, or if there is no media in the specified drive.
2. Select **Remove annotations** to remove any annotations from the exams.
3. Select the desired **Language** from the list for the IntelliSpace PACS program and documentation.
4. Select either the **Philips Proprietary Format** or **DICOM Format** check boxes, or select both check boxes for the exported exams.
   - **Philips Proprietary Format**: The standard, wavelet-encoded Philips format.
   - **DICOM Format**: The raw, unadulterated DICOM data from the modality. When you set this option, the DICOM information is stored in a separate directory on the portable media, called DICOM. You can copy this directory directly to other DICOM systems and archives. This

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is the most effective way to transport studies to other facilities that do not have IntelliSpace PACS, for consultation, education, or research. Select **Include DICOM Viewer** to make sure a DICOM Viewer is available.

- **Both**: Selecting both check boxes provides maximum flexibility for working with and transferring the exported data, but uses more space on the portable media you select.

5. Select the **Anonymize** check box to export exams with anonymized patient information. See 'Working with Anonymized Exams in the Media Viewer' (see page 301).
6. Review the **Summary** area to see the **Required Disk Space** and **Available Disk Space**. The initial values reflect the size of the CD/DVD version of the IntelliSpace PACS control.
7. To remove an exam from the Exam List, right click the exam and click **Delete**. Click **Yes** to remove the selected exam.
8. To password-protect the CD/DVD to protect patient confidentiality, select the **Enable Password** check box enter and confirm the desired password. You can only password-protect Philips Proprietary Format; the DICOM data is not password-protected.
9. If the BSN (Burger Service Number) feature is enabled on the IntelliSpace PACS server, and the export configuration you have selected has BSN enabled, the **Export BSN** check box is available. Select this check box if you want BSN information to be included in the Media Viewer export. See 'Setting iExport Preferences' (see page 380).

NOTE ***The BSN (Burger Service Number) feature is only available for IntelliSpace PACS sites in The Netherlands.***

10. Click **Start** to begin exporting the exams. If you are writing to a CD/DVD, Windows begins the CD/DVD creation process. The status bar at the bottom of the screen provides updated information on the progress of the export. In addition, each exam being written to the media displays a symbol that indicates the progress of that individual exam. The following symbols are used.
    - Light green dot: Ready to be written

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- Light green arrow: In Progress
- Blue check: Completed
- Red X: Failed
- Dark green dot: Inactive

11. After the exams have been exported, the specified Export folder contains the **MediaViewerLauncher.exe** file. Run the MediaViewerLauncher.exe file to open the IntelliSpace PACS Media Viewer.

NOTE ***If you password-protect the CD/DVD and subsequently the password is lost, there is no way to recover the lost password.***

15.1.2 Working with Anonymized Exams in the Media Viewer

1. Do one of the following:
   - In the Folder List, copy exams from a Personal or Public Folder that contains anonymized exams to the Local Export folder. See 'Making Patient Information Anonymous' (see page 56).
   - Copy non-anonymized exams to the Local Export folder and make them anonymized from within the Media Viewer.
2. Select **DICOM Format** or both check boxes (Philips and DICOM), and then select **Anonymize** for the exported exams.

15.1.3 Working with VIP Patient Exams in the Media Viewer

Certain patients, such as politicians, entertainers, and hospital employees, may be designated as VIPs (Very Important Persons) in IntelliSpace PACS. Accessing these patient records and performing all actions (such as opening exams, viewing images, exporting exams from the Media Viewer, and so on) are audited.

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If you move several exams to the Media Viewer folder and some of the exams are for sensitive patients, the names and MRNs of the sensitive patients are listed before the exams are exported to the Media Viewer folder. You can choose to either export all these exams or cancel the export operation.

15.1.4 Using the CD/DVD

1. Insert the portable media device. The disk plays automatically when you insert it; no internet connection is needed.
2. If the portable media device has been password-protected, a login screen is displayed.
3. Enter the password associated with the portable media device.
4. Click **Log In**. A list of the exams on the portable media device displays.

Click the help icon to display the IntelliSpace PACS Media Viewer help.

15.2 Printing to Paper

NOTE ***If the image is larger than the paper size (for example, in true-size), parts of the image will be automatically cropped out on the print-out.***



WARNING ***Images printed to paper from IntelliSpace PACS are not intended for diagnosis, and should be used only for communication purposes.***

You can print an entire exam or selected windows to your default printer. To print only one or more image(s) in a series (for example, two slices of an MR exam), make those slices key images and then print only key images.

1. Right-click on an image and from the menu, select **Print** and then **To Paper**. The **Print to Paper** dialog box displays.
2. From the **Name** list, select the desired printer.
3. From the **Print Configuration** list, select the desired configuration (for example, 3x4 stack).
4. From the **Optimize For** list, select **Best Image Quality** or **Faster Image Printing**.
5. Enter the **Number of copies**.

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6. Enter an **Image Skip** pattern, if desired (for example, to skip every other image, enter 2).
7. In the **Print Range** area, select whether you want to print the **Entire Exam** or **Selected Window(s)**.
8. In the **Print Options** area, check the options you want. For example, select the **Print single images on separate sheets** check box if you want to print different plain film series on separate sheets, regardless of how much space is available.
9. If you are printing CT, MR, or other stack series, check **Print Reference Frame** to include the reference frame. When this option is checked, the **Reference Frame Options** area becomes active. Select the desired **Series** and **Image**.
10. In the **Trim Images** area, select how or if you want to trim images. You can trim from the front, back, or both.
11. After you have selected the desired options, the bottom of the **Print to Paper** dialog box shows the number of pages necessary to print the selected configuration.
12. Click **OK**.

15.3 iExport for DICOM Export

The iExport tool allows users with administrative privileges to monitor the export of DICOM exams and the export queue. Your IntelliSpace PACS System Administrator first needs to configure the destination DICOM device(s).

IntelliSpace PACS allows for multiple instances of the iExport Service to support larger distributed configurations and to distribute the processing of requests to export patient studies to external DICOM devices.

iExport works with the **DICOM** functions which allow users to export IntelliSpace PACS exams as DICOM to another DICOM device, such as a DICOM printer, a 3D imaging tool, or a DICOM archive.

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NOTE ***All raw DICOM and imaging is exported. However, native iSyntax presentation states not in GSPS are not exported.***

Certain patients, such as politicians, entertainers, and hospital employees, may be designated as VIPs (Very Important Persons) in IntelliSpace PACS. Accessing these patient records and performing all actions (such as opening exams, viewing images, exporting exams, and so on) are audited.

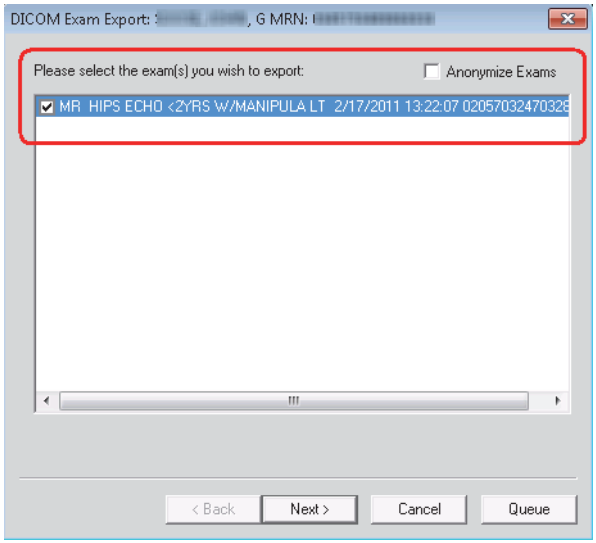
If you use iExport for several exams and some of the exams are for sensitive patients, the names and MRNs of the sensitive patients are listed before the exams are exported. You can choose to either export all these exams or cancel the export operation.

On any page of the iExport Wizard, you can click **Queue** to open the iExport Queue dialog to see how busy the queue is. See 'Viewing the iExport Queue' (see page 310).

NOTE ***You can use iExport for exams with anonymous patient information. See 'Exporting Anonymous Exams' (see page 307).***

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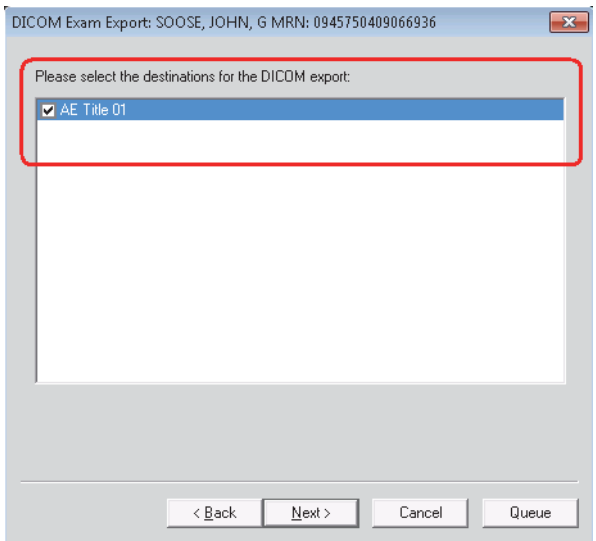
1. Right-click an exam listing from any worklist, the Patient History, the Relevant Exams, or the exam rack, and from the menu, select **Export via DICOM**.



2. Select the exam(s) that you wish to export. To make exported patient information anonymous, select the **Anonymize Exams** check box. See 'Exporting Anonymous Exams' (see page 307).

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3. Click **Next**.


DICOM Exam Export: SOOSE, JOHN, G MRN: 0945750409066936
Please select the destinations for the DICOM export:
AE Title 01
< Back
Next >
Cancel
Queue

4. Select the destinations for the DICOM export and click **Next**.
5. If the BSN (Burger Service Number) feature is enabled on the IntelliSpace PACS server, and the export configuration you have selected has BSN enabled, the **Export BSN** check box is available. Select this check box if you want BSN information to be included in the export. See 'Setting iExport Preferences' (see page 380).

NOTE ***The BSN (Burger Service Number) feature is only available for IntelliSpace PACS sites in The Netherlands.***

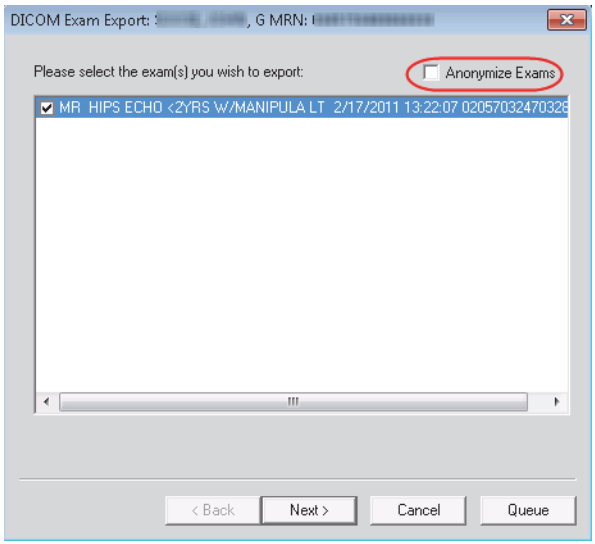
6. Review the exam and destination information and click **Back** to correct.
7. In the Notifications section, enter the following additional information if desired:
   - Enter an email address for notification of when the export is complete. Separate email addresses by commas.
   - Select the appropriate **Priority: Normal**, **Urgent**, or **STAT**.
   - Add a **Description** of the exam.
   - Click **Queue** to see how busy the queue is.

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8. Click **Finish** to begin the export.

15.3.1 Exporting Anonymous Exams

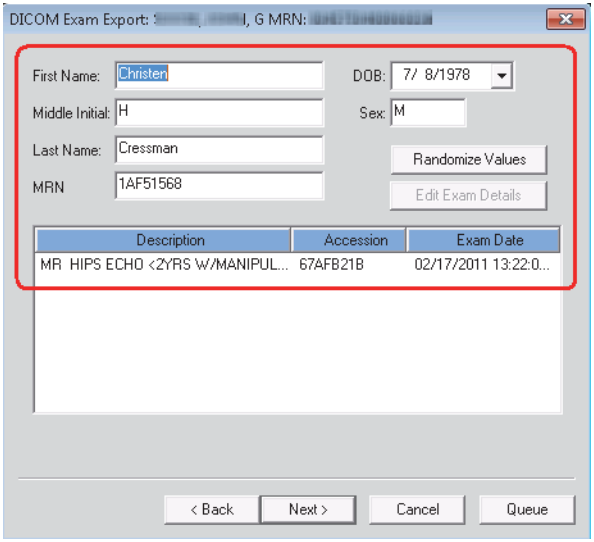
1. Right-click an exam listing from any worklist, the Patient History, the Relevant Exams, or the exam rack, and from the menu select **Export via DICOM**.



2. Select the exam(s) that you wish to export. To make exported patient information anonymous, select the **Anonymize Exams** check box.
3. Click **Next**.

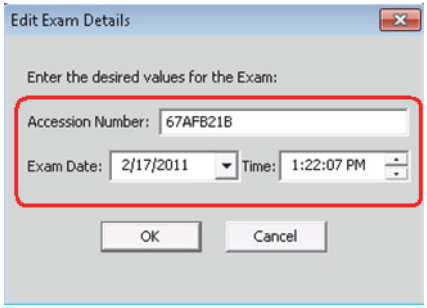
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4. Review the anonymous exam information, including the **First Name**, **Middle Name**, **Last Name**, **MRN**, **DOB**, and **Sex**.



5. If desired, click **Randomize Values** to change the anonymous patient information.

6. To change the **Description**, **Accession Number** or **Exam Date**, select the exam and then click **Edit Exam Details,** or double-click the exam in the list. The **Edit Exam Details** dialog box opens, allowing you to enter the desired information.

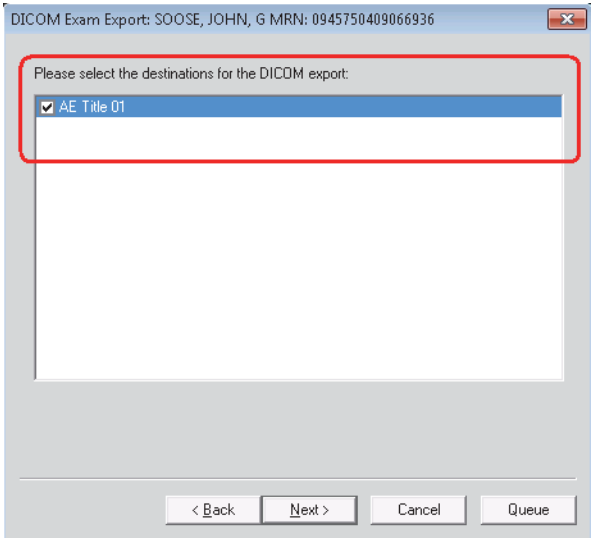


7. Click **OK**.

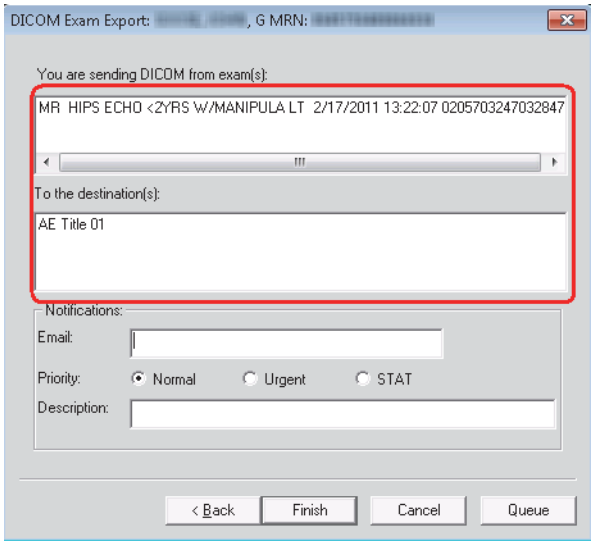
8. Click **Next**.

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9. Select the DICOM devices to which you wish to export the exam. The DICOM devices listed are compiled from an IntelliSpace PACS dictionary set up by your IntelliSpace PACS System Administrator.


DICOM Exam Export: SOOSE, JOHN, G MRN: 0945750409066936
Please select the destinations for the DICOM export:
AE Title 01
< Back
Next >
Cancel
Queue

10. Click **Next**. A summary of the export of the series and images is displayed.



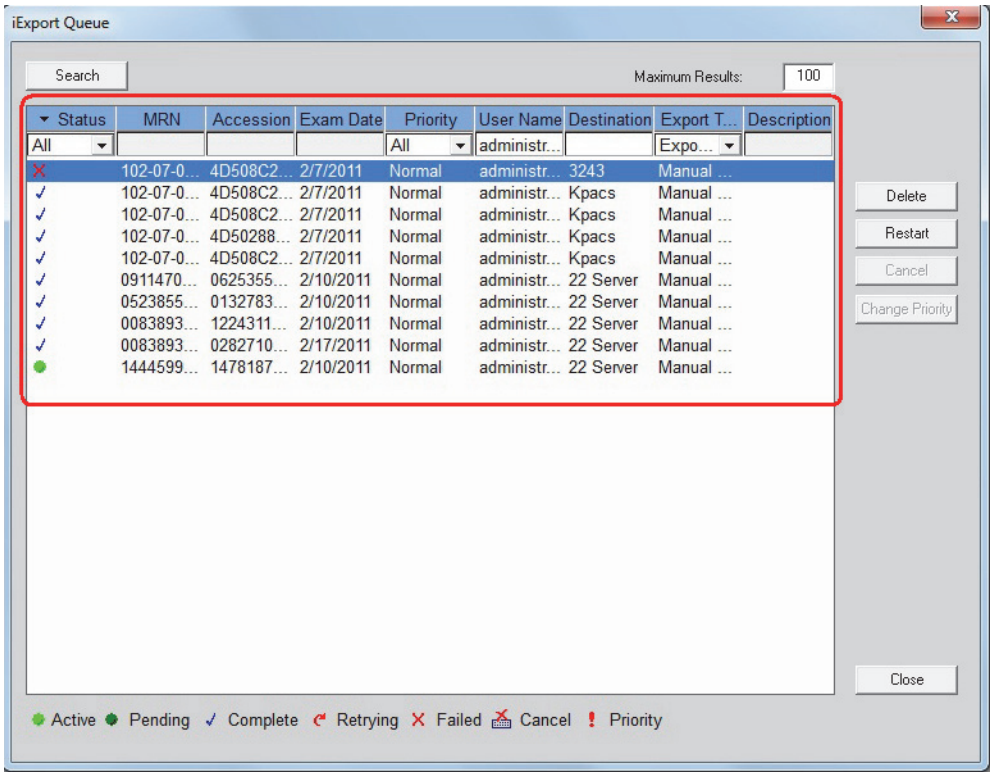
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11. Review the exam and destination information and enter the following additional information in the Notifications section if desired:
    - Enter an email address for notification of when the export is complete. Separate email addresses by commas.
    - Select the appropriate **Priority: Normal**, **Urgent**, or **STAT**.
    - Add a **Description** of the exam.
    - Click **Queue** to see how busy the queue is.
12. Click **Finish** to begin the export.

15.3.2 Viewing the iExport Queue

If you have the proper permissions, you can view the iExport Queue at any time to view the status of all exams being exported in the system.

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Note the following:

- Columns are sortable.
- Action buttons – **Delete**, **Restart**, **Cancel**, **Change Priority** – are displayed in the right side of the screen.
- Status icons with a brief description are displayed at the bottom of the screen.

System Administrators can add, edit, and remove existing DICOM destinations for the iExport tool in the System preferences. See 'Setting iExport Preferences' (see page 380).

1. Do one of the following:

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- Click **Queue** from the **DICOM Export** dialog box.
- Click **Queue** from the **Send/Export via DICOM** dialog box.
- Click the **Q** icon in the IntelliSpace PACS Control Strip.

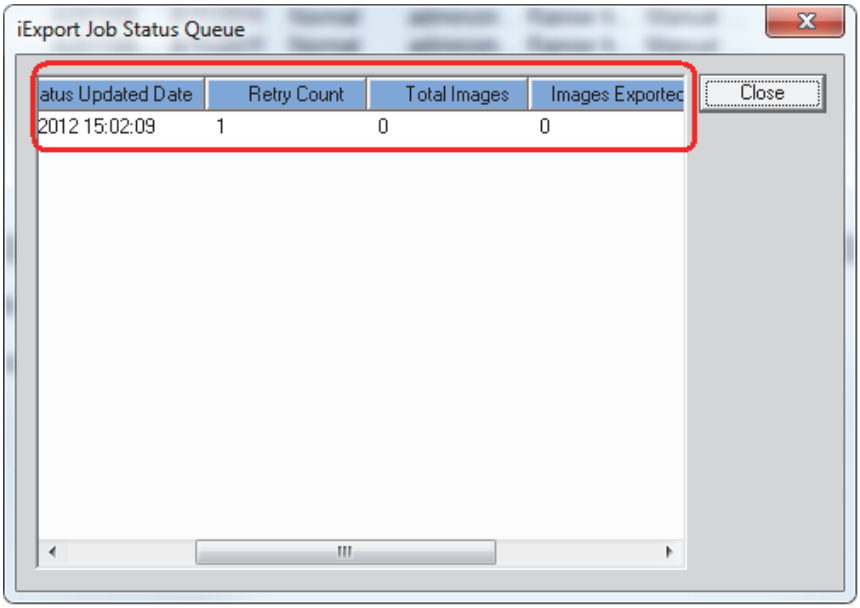
2. The DICOM queue is displayed in the **iExport Queue** dialog box. Results are filtered by the **Status** and **Export Type** criteria. The status icons display the current status of the exam's export. You can do the following:
   - Sort the resulting queued exams by clicking the desired column header.
   - Search for iExport requests by clicking **Search**. The following search parameters are supported: **User Name**, **Priority**, **Status**, **Destination**, and **Export Type**.
   - Refresh the list by clicking **Search**.
   - Remove an exam from the list by highlighting it and clicking **Delete**. A confirmation message displays. (You cannot delete export requests with Retrying or Active status.)
   - Restart an exam export that has failed by clicking **Restart**. (You can restart only export requests with Failed status.)
   - Cancel the request by clicking **Cancel**. (You can cancel only export requests with Pending or Retrying status.)
   - Change the priority of a submitted request by clicking **Change Priority**. (You can change the priority only for export requests with Pending status. After a request has been picked up by an Export Service, changes to priority may not affect the execution of the request.)
   - Note that the **Delete**, **Restart**, **Cancel**, and **Change Priority** buttons are all disabled while an export request has Active status.
3. Click **Close**.

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15.3.3 Viewing iExport Progress Information

You can double-click an iExport job in the **iExport Queue** dialog box to view its progress in the **iExport Job Status Queue** window. The **iExport Job Status Queue** window displays the following progress information: **Creation Date**, **Status Updated Date**, **Retry Count**, **Total Images**, **Images Exported**, and **Error Message**.

1. Double-click an iExport job. The **iExport Job Status Queue** window opens.



2. Review the information and click **Close**.

To view the latest progress of an iExport job, click **Search** in the **iExport Queue** dialog box to refresh the list, then double-click the job for which you want to view progress.

15.3.4 Canceling Active iExport Jobs

Long running iExport jobs which are in active state can be canceled from the iExport Queue. These jobs are not guaranteed to cancel completely but will stop after the periodic cycle finds a “Cancel” request for the job.

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What is actually canceled depends on what was in the process of being sent when the cancel request occurred.

15.4 iQuery for DICOM Study Retrieval

The iQuery tool allows an authorized user to retrieve DICOM studies from your institution's digital archive and send them to IntelliSpace PACS. If you have the iQueryExecute permission, you can query the archive, submit studies to be moved, and view the queue. In addition, with the proper permissions, you can perform different tasks related to viewing and managing the queues, as well as managing queries and retrievals from the Exam Timeline and from within the iQuery window. These tasks are available in the PACS Administration page.

If you have authorization and your institution has one or more digital archives, iQuery is available from the Folder List. See 'Folder List' (see page 51).

You can select one remote archive to query or you can select all archives to query. When more than one archive is available, the default archive selection is **All**. Each archive has a specified Query Model, which determines how iQuery filters the tags:

- Patient Root QR
- Patient/Study Only QR
- Study Root QR
- Unsupported FIND Order – If the configured supported model for the remote archive is not known, then the order of negotiation by iQuery is as follows:
  - StudyRoot
  - PatientRoot
  - PatientStudyOnly Root

The following are the four query levels:

- Patient level – query tags are patient name and MRN

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- Study level – query tags are study date, study time, Accession Number, Study ID, Study Instance UID, Modalities used in Study, referring physician name, study description, patient birthdate, patient sex, number of study related series, number of study related instances

  All study level queries can be done only for a given patient.

- Series level – query tags are modality, Series Number, Series Instance UID, requested procedure ID, scheduled procedure Step ID, performed procedure step start date, performed procedure step start time, number of series-related instances, series description

  All series level queries can be done only for a given patient and Study UID.

- Image level – query tags are Instance number, SOP Instance UID, SOP Class UID

iQuery filters the query tags based on whether the Patient Name and MRN are specified as wild cards. When the Patient Name and MRN are not specified as wild cards, iQuery filters the query tags based on the selection of the Archives chosen as follows:

- If the “All” archives option is selected, only the Patient Name and MRN tags are considered for querying. All other tags are ignored.
- If a single archive is selected whose Query Model is set to either “Unknown” or “Patient-Study Only”, only the Patient and Study level tags are considered for querying. All other tags are ignored.
- If a single archive is selected whose Query Model is set to either “Patient Root” or “Study Root”, tags at all levels are considered for querying.

When the Patient Name and MRN are specified as wild cards, iQuery filters the query tags based on the selection of the Archives chosen for querying as follows:

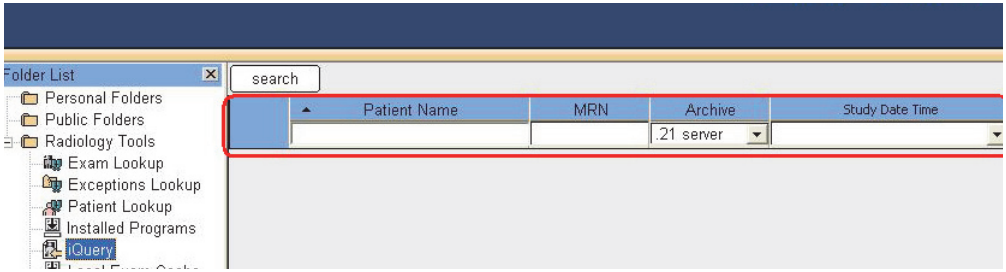
- If the “All” archives option is selected, only the Patient Name and MRN tags are considered for querying. All other tags are ignored.
- If a single archive is selected whose Query Model is set to either “Unknown”, “Patient-Study Only”, or “Patient Root”, only the Patient level tags are considered for querying. All other tags are ignored.

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- If a single archive is selected whose Query Model is set to “Study Root”, only the Patient and Study tags are considered for querying. All other tags are ignored.

To perform a query using iQuery

1. Click **iQuery** in the Folder List. The **iQuery** main page displays, and contains the search fields you use to enter the patient data that you wish to retrieve.

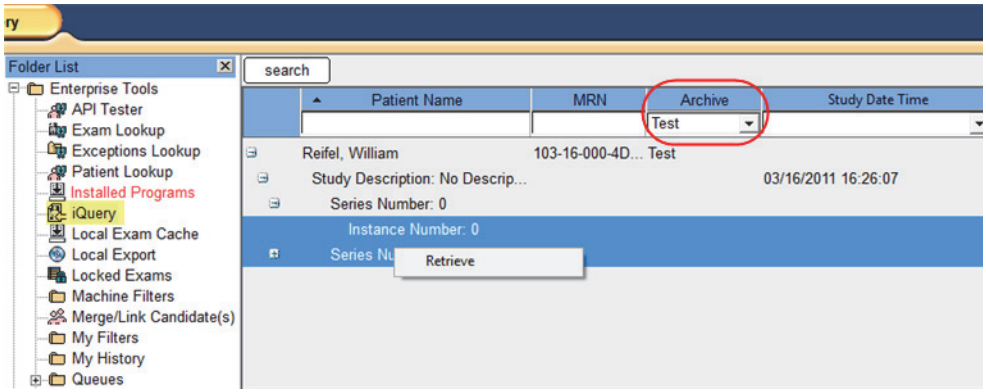


2. Enter the query criteria into the appropriate search fields and click **Search**. iQuery searches all available archives.
3. To restrict your search to a particular archive (such as VNA), select it from the **Archive** list by clicking the dropdown arrow in the **Archive** field, and then clicking **Search**.
4. During the search, the **Search** button changes to a **Stop** button, which is enabled. To stop the query, click **Stop**.
   - The patients that match your query are displayed below the query fields. If no studies match your query, you will be notified by a message in the IntelliSpace PACS Control Strip.
   - The maximum results that can be displayed at any time are 50. If more than 50 studies match your search criteria, only 50 are displayed and the Control Strip displays a message that you must narrow your search.
   - For a Patient Root Model Query, the maximum number of patients displayed is 50.

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- For a Study Root Query Model, the maximum number of studies displayed for a single patient is 50, if all of those studies belong to one patient. If any of the studies are expanded and you run another query, the results of that subsequent query are also limited to 50.

5. View the studies available for a patient by clicking the plus symbol to the left of the patient name.

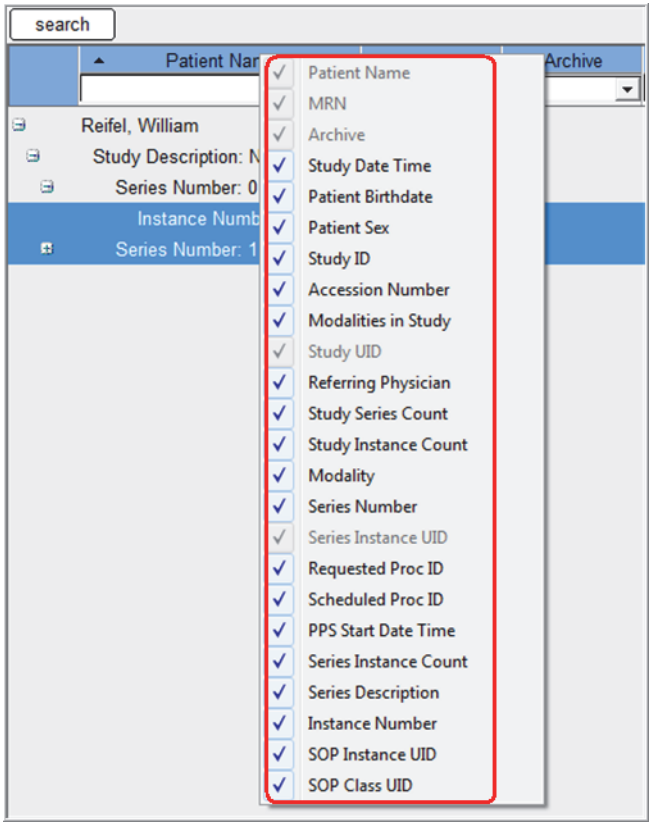


6. Expand the list under the Patient Name by clicking the **+** sign in front of **Study Description** and then **Series Number**. If there are several series in a study or several instances in a series, the series and instances are numbered based on the Series Number and Instance Number DICOM tags respectively.

7. To configure the query retrieval columns display, right-click a **Series Number** or **Instance Number** (including any DICOM state, such as a Presentation State) to select/deselect the columns you want to display. By

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default, all query retrieval columns are selected. Note that Patient Name, MRN, Archive, Study UID, and Series Instance UID are automatically selected and grayed out, so they cannot be deselected.



8. Right click any displayed row and click **Retrieve**.

WARNING

- ***Data that has been retrieved from a VNA archive may be changed in the VNA by a third party user while a copy of the data is stored in the IntelliSpace PACS Cache. To make sure that you have the latest patient and study information, delete the study in the Cache using the Server Utility Tool, and then use iQuery to search the VNA archive for the latest data. Note that when the Cache reaches capacity, studies are automatically deleted. Therefore, verify that the study is present in the Cache, because if the Cache is full, the study may be deleted automatically.***

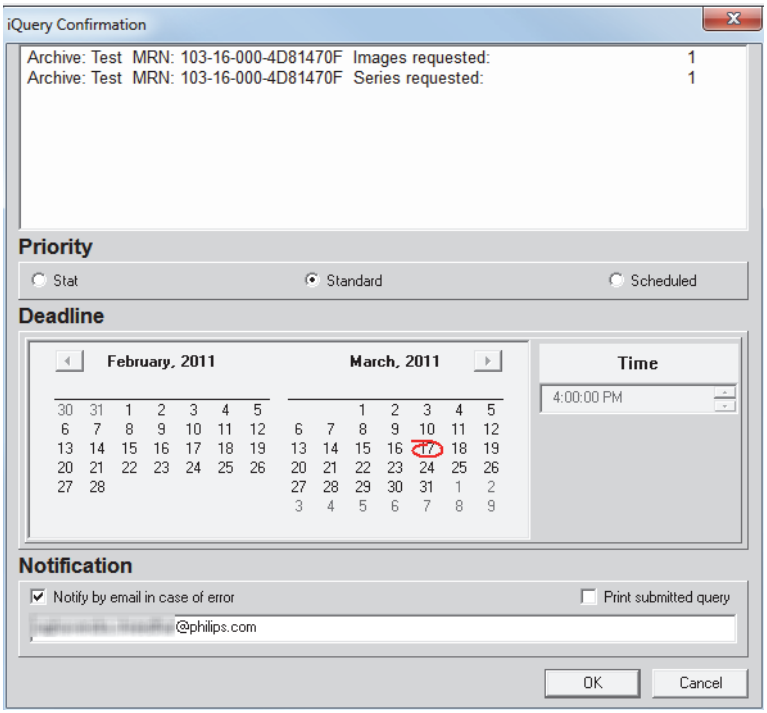
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- ***During DICOM Query of a VNA from the Timeline, a message displays on the Canvas Page if retrieving data from a VNA archive takes too long or if the DICOM file is extremely large. The Canvas Page displays the images after they have been retrieved. The user can click Retry to load the images.***

15.4.1 Submitting and Confirming the Retrieval List

The number of studies your have selected and the archives in which they are stored are displayed in the top dialog box of the **iQuery Confirmation** dialog.

1. Click **Retrieve**. A confirmation page displays.



2. Select a priority for the request you are submitting in the **Priority** field.
   - **Stat**: Requests that the archive send the studies immediately and with high priority.

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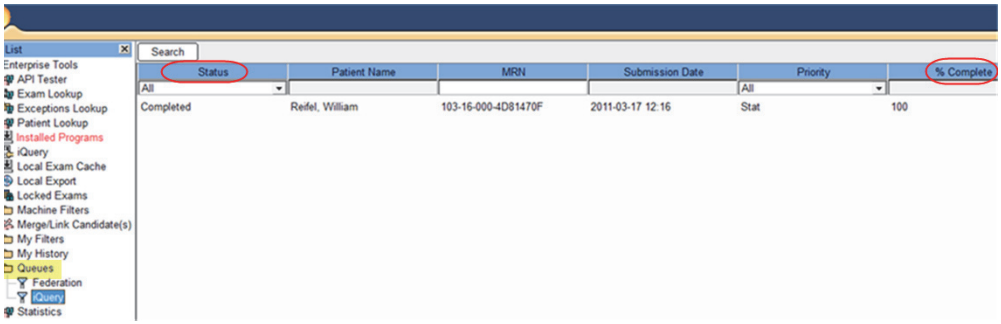
- **Standard**: Has the studies available as soon as possible and with normal priority. This is the default setting.
- **Scheduled**: Displays the **Deadline** dialog box and allows you to set the date and time that you need the studies by.

3. If you want to be notified if an error occurs while your request is being processed, select the **Notify by email in case of error** check box and enter the email address(es) to which you want notification sent.
4. To print a copy of the request list for your records, select the **Print submitted query** check box. When the request is complete, a copy of the request is printed to your default printer.
5. Click **OK** when you have finished. You return to the main iQuery screen.

15.4.2 Viewing the iQuery Queue

The iQuery Queue provides a number of ways to alter the retrieval process. Note that these functions are only available to users with administrative privileges.

1. To view the studies awaiting retrieval, in the Folder List, click **Queues** and then click **iQuery**. The studies display in the right pane of IntelliSpace PACS.



2. The **Status** of each retrieved study retrieval is listed in the first column, and the **% Complete** of each study retrieval is displayed as well.
3. Do one of the following:

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- To remove a study from the queue, highlight that study and click **Delete**. A confirmation message displays. Note that only completed and failed jobs can be deleted.
- Only Submitted jobs can be canceled. In addition, you can change the priority of a Submitted job.
- You cannot retry the studies which iQuery failed to retrieve; however, the Retrieve operation is programmed for automatic retry.
- To search for retrieve jobs that meet the criteria specified in the query fields, click **Search**.
- To show all retrieve jobs that have been in the queue, select **All** in the Status field, and then click **Search**.

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16 Managing Studies and Images

16.1 Overview

The following tasks apply to managing studies and images in IntelliSpace PACS:

- 'Resolving Duplicate UIDs' (see page 323)
- 'Resolving Cases Where Multiple Patients' Studies are Merged into a Single Study' (see page 326)
- 'Searching for Study Instance UIDs' (see page 328)
- 'Deleting Studies and Images' (see page 329)
- 'Using Statistics and Running Reports in IntelliSpace PACS Enterprise' (see page 332)

16.2 Resolving Duplicate UIDs

The DICOM standard prohibits assignment of a given Study UID to more than one study; however, duplicate UIDs can unfortunately still occur. The following tools enable you to resolve problems related to duplicate UIDs.

- 'Removing the Demographics Mismatch Warning' (see page 324)
- 'Manually Assigning New Unique Study Instance UIDs' (see page 324)
- 'Deleting Studies and Images' (see page 329)

Two detection levels for duplicate UIDs are supported:

- Level 1: Duplicate if the image's Patient ID is different from the reference image's Patient ID and either the Patients Name or the Patients Birth Date are different.
- Level 2: Duplicate if the image's Patient ID is different from the reference image's Patient ID.

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WARNING ***Deleting studies is permanent, meaning that deleted studies cannot be recovered. Deleted images can be recovered. However, all presentation states, measurements, and annotations are lost. Also, if an image has been deleted after receiving a new Study UID, the image cannot be recovered. Be aware that deleted images may contain data that would render a different diagnosis.***

16.2.1 Removing the Demographics Mismatch Warning

Users with administration privileges can permanently resolve the DUP UID warning message; users without these privileges can hide the warning message but still view the images.

1. Open the study in the Exam Rack.
2. Right-click on the image and do one of the following:
   - To permanently turn the "Demographics Mismatch Caution" warning off, right-click and select **Remove Demographic Mismatch**.
   - To temporarily turn the "Demographics Mismatch Caution" warning off, right-click and select **Hide Demographic Mismatch Warning**. This only hides the warning message. The study is still considered a DUP UID; this option is only available if there are multiple demographics associated with the study.

16.2.2 Manually Assigning New Unique Study Instance UIDs

In order to manually assign a New Unique Study UID, the following conditions must be met:

- You have been assigned the "Images: Resolve Duplicate UID Images" task
- The exam status is anything but Scheduled.

You can manually assign a new, unique Study Instance UID to:

- One image (window that contains single image)
- One series (window that contain series with multiple images)
- Multiple windows (multiple single images/series) in the rack (selected with Shift-click)

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IntelliSpace PACS audits each time a new Study Instance UID is assigned to an image or group of images.

WARNING ***Users with appropriate permissions should not assign new Study UIDs to studies that have not been confirmed to be complete (status is not designated "Complete").***

NOTE ***You cannot assign a new Study Instance UID to exams with anonymous patient information. See 'Making Patient Information Anonymous' (see page 56).***

In the following example, the CT Study of Patient: Eric Bowers also contains images of Patient: Eric Smith.

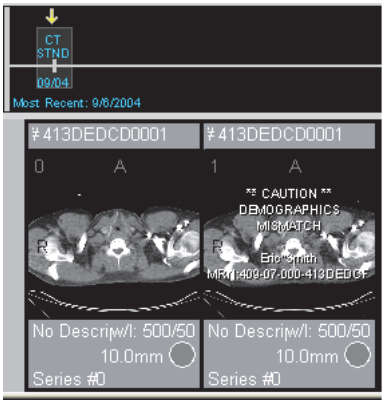


Figure 16.1 DUP UID example

1. Use the **Exceptions Lookup** to find the images that are flagged as DUP UID images.
2. Open the exam that contains the images that are flagged as DUP UID images. These images are displayed with a "Demographics Mismatch Caution" message on top of the image.
3. Verify the **Study Description** and **Selected Series/Image(s)** information.
4. Review the exam to make sure it is a true DUP UID case.
   - If the exam is not a true DUP UID, and you have administrator privileges, right-click the image and select **Remove Demographic Mismatch** from the menu. This permanently turns off the warning.

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- If the exam is not a true DUP UID, and you do not have administrator privileges, right-click the image and select **Hide Demographic Mismatch Warning** from the menu. This hides the warning, but the warning will persist for other users until the PACS Administrator resolves the DUP UID case.

5. If it is a DUP UID case, right-click the image and from the menu, select **Assign New Unique Study UID**. The **Assign New Study UID** dialog box displays, allowing you to verify the images you have selected and enter a reason for the assignment. (Note that this option is not available if all image windows in an exam are selected, because you cannot delete all image windows in an exam.)
6. Enter the **Reason** you want to create a new Study Instance UID (for example, "Images belong to a different patient").
7. Click **OK**. The Study Instance UID of the selected images are updated and the exam is rehung. A message displays while this occurs. Note that the total number of images is not updated after a new Study UID is assigned.
8. Verify that the images have not become an exception study.

NOTE ***The images that have been assigned a new Study Instance UID are re-registered. Therefore, the DICOM metadata key fields are used to validate the images against an existing patient and exam. If the images cannot be validated, the new study becomes an exception.***

16.3 Resolving Cases Where Multiple Patients' Studies are Merged into a Single Study

In cases where multiple patient's images have been merged into a single study, the Demographics Mismatch Caution message does not display, because all the images in the exam have the same patient demographics.

You can use the **Split Exam** feature to temporarily split a series according to specific DICOM tags to assign a new Study Instance UID.

In the following example, a CR CHEST image accidentally ended up in a CR ANKLE study.

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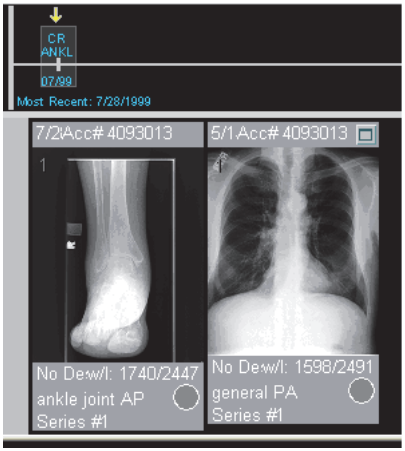


Figure 16.2 DUP UID merge example

1. Use the **Patient Lookup** or **Exam Lookup** to find the exam that requires study management.
2. Open the exam and identify the series/images that belong to a different patient study. Note that the DUP UID Mismatch Caution message does not display on the image, because all the patient demographics of all images in this exam are the same. You can only determine that images belong to a different patient study by being familiar with the patient study and by reviewing the images themselves.
3. Select the series that belong to a different patient study by highlighting the image series or selecting multiple image series using the Shift key.
4. Right click and select **Assign New Unique Study UID** from the menu.
5. Enter the **Reason** you want to assign the new Study Instance UID.
6. Click **OK**. One of the following occurs:
   - Study stays in the same exam rack. This may occur if the MRN and Accession Number match the current exam.
   - Study moves to a different exam rack. This may occur if the MRN and Accession Number match a different exam.
   - Study becomes an Exception. This may occur if the MRN and/or Accession Number do not match an existing exam.

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7. The image is still displayed in the same Exam Rack because, besides the new unique Study Instance UID, the image still has the same patient and exam demographics.
8. Right-click the image and select **Detach Study from Exam** from the menu. The study will become an exception in the **Exceptions Lookup**. Use the **Exceptions Handler** to resolve the exception. See 'Using the Exceptions Handler' (see page 180).

16.4 Searching for Study Instance UIDs

When IntelliSpace PACS encounters DICOM processing errors, an email is sent from the IntelliSpace PACS server to the designated IntelliSpace PACS System Administrator. This email can be sent to multiple email recipients if there is more than one IntelliSpace PACS Administrator. The email indicates the following study information, if provided:

- Study Date/Time
- Accession Number
- Study UID
- Series UID
- Image UID
- Missing/Invalid DICOM Tag(s)

If any of the UIDs or Tags is invalid per the DICOM standard, the email indicates this next to the invalid value. This information is useful for IntelliSpace PACS System Administrators to perform baseline troubleshooting by deducing if the study presentation could affect patient care adversely.

IntelliSpace PACS Administrators equipped with the Study UID can then utilize the **Study Lookup** to search the IntelliSpace PACS system for the study. This feature is designed specifically for IntelliSpace PACS System Administrators who receive email notifications about specific DICOM studies which need to be followed up on, such as in DICOM processing errors or DUP UID scenarios. The emails do not contain any patient

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information. With **Study Lookup**, IntelliSpace PACS System Administrators can look up and open a study using just the Study UID provided in the email notification.

The Folder List includes the **Study Lookup** option that you can use to search for and open a study using the Study UID (SUID) number. IntelliSpace PACS displays the following search result information for the study:

- Patient name
- Patient ID
- Accession number
- Modality
- Body Part

1. In the Folder List, click **Study Lookup**.
2. Type in (or paste) the SUID.
3. Click **Search**. The study information displays if found. Otherwise, an error message displays.
4. Click **Open** to view the study on the Canvas Page. The Canvas Page displays the study.
5. The PACS Administrator can access the integrity of the study to determine if the study needs to be deleted from IntelliSpace PACS and resent from the modality.

16.5 Deleting Studies and Images

Depending on your security access rights (permissions), you can delete an entire study or a single image. When an image is deleted, IntelliSpace PACS keeps a record of the following information, which is available in the Administrator Tool:

- IntelliSpace PACS User ID
- Deletion Date
- Deletion Time

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- Modality
- Accession #
- MRN
- Series/Image UID
- Series/Image Description/Number
- Reason for Deletion

Note the following:

- IntelliSpace PACS displays a Warning when you attempt to delete images of an exam that has already been marked read.
- IntelliSpace PACS audits each time a series or image is deleted or recovered.
- IntelliSpace PACS provides a tab in the Statistics page in the Folder List where PACS Administrators can review the audit logs.
- We strongly recommend that you use the Duplicate UID feature to delete an image, as images that are accidently deleted using DUPUID can be recovered.

Users with the administrator privileges can recover deleted images to undo accidental deletion of images.

However, if the selected window has only a single image, is a clone, or has multi-frame image(s), you cannot delete it.

NOTE ***You cannot delete images in exams with anonymous patient information. See 'Making Patient Information Anonymous' (see page 56).***



WARNING ***Deleting studies is permanent, meaning that deleted studies cannot be recovered. Deleted images can be recovered. However, all presentation states, measurements, and annotations are lost. Also, if an image has been deleted after receiving a new Study UID, the image cannot be recovered. Be aware that deleted images may contain data that would render a different diagnosis.***

1. On the Canvas Page, right-click on an image, and from the menu select one of the following options:

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- **Delete All Image(s)**: Removes every image from a selected series
- **Delete Image**: Removes only the current image

2. If the exam being viewed has not been read, the **Reason for Deletion** dialog box displays. If the exam has been marked as read, a confirmation message displays before the image is deleted. When you click **Yes** in the confirmation message, the **Reason for Deletion** dialog box displays.
3. Enter the reason for deleting the image or select a reason from the list.
4. Click **OK**. The image(s) are deleted from the selected window and from the corresponding clone window(s), if any. Note that the total number of images is not updated after images are deleted.

16.5.1 Recovering Deleted Images

Deleted images are marked as such in the IntelliSpace PACS database and are no longer accessible to IntelliSpace PACS users. IntelliSpace PACS does not remove the actual images from the disk, and users with the proper administration privileges can use the **Recover Deleted Images** feature to undo the accidental deletion of images. The **Recover Deleted Images** feature is available at the exam level, not at the individual series/image level.

1. Right-click in the exam margin and from the menu, select **Recover Deleted Images**. IntelliSpace PACS displays a message if recovery is successful.
2. Close and re-open the exam to view the recovered image.

16.5.2 Questions and Answers on Deleting Images

What happens when you delete an image, and IntelliSpace PACS receives the same image again?

The image is rejected/ignored by IntelliSpace PACS because of a duplicate Image UID.

Can you delete an image that is covered by a rectangle, or that has a clone that is covered by a rectangle in IntelliSpace PACS Radiology?

No, the **Delete** option is temporary disabled under these conditions.

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What happens to a clone when I delete a series or image?

The cloned image is also deleted.

Can you delete an image of an exam after the exam has been marked read?

Yes, but IntelliSpace PACS does display a warning message: "This exam has been Marked Read. Are you sure you want to continue and delete image(s) of the selected window?"

What happens when a Radiologist loads an exam, and after the exam is opened another user deletes a few images of the opened study?

The Radiologist will not notice any change, until they close and reload the exam.

What about multiple users trying to delete images at the same time?

When an image is deleted, the second delete causes a warning message that this series/image has already been deleted by another user.

What if an exam has only one image left?

It is not possible to delete an image if it is the last image in an exam. In this case the workaround option is to detach the study from the exam, and Remove the study from the database.

What happens when you delete and then recover an image that has measurements or annotations on it?

In this case, you lose the Presentation State information of this image. Typically, images are deleted relatively quickly after they are acquired and do not contain critical annotations and measurements.

16.6 Using Statistics and Running Reports in IntelliSpace PACS Enterprise

In IntelliSpace PACS Enterprise, you can run statistics and publish billing reports.

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For statistics, you can generate the following:

- Daily Usage Statistics
- Monthly Usage Statistics
- Monthly/Daily Usage Statistics in Grid View

You can generate any of the following six Billing Report Types:

- Daily
- Monthly
- Archived Exams
- Archived Studies
- Received Studies
- Viewed Studies

To view statistics and run a report, do the following:

1. In IntelliSpace PACS Enterprise, click the **Statistics** folder in the **Folder List**.
2. Select the **Usage Statistics** tab (at the top of the right pane).
3. In the **Study Statistics** section, click the **Report Type** dropdown arrow, and select the type of report you want to generate:
   - Daily
   - Monthly
   - Archived Exams
   - Archived Studies
   - Received Studies
   - Viewed Studies
4. Click the **Date** dropdown arrow and select the date that you wish to query.
5. When you have made your selections, click **Query**.

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6. If there is matching data for the selected date, the results are displayed in Grid view, and the **Select Columns** button is enabled. In addition, the **Download Report** button is enabled.
7. If there is no matching data for the selected date, an error message displays: No data exists for the specified Report Type and Date.
8. Click **Download Report** to open or save the report file.
9. In the **File Download** dialog box, click **Open** to view the file or click **Save** to save the file as a tab-delimited matching text file.

16.6.1 Selecting Columns for Statistics Grid View

Once you have run a successful query, the **Select Columns** button is enabled in the Study Statistics section of the Usage Statistics tab.

In this view you can select the output columns that you want visible in grid view.

The Select Columns options are:

- Modality
- Station
- Received Studies
- Received Images
- Study Size (MB)
- Viewed Studies
- Archived Studies
- Viewed Studies (ISE only)
- Viewed Studies (ISE)
- Received Exams
- Archived Exams
- Viewed Exams (ISE only)
- Viewed Exams (ISE)

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- isPrior
- Manufacturer
- ipAddress
- AETitle
- Institution
- Department
- Model
- ProcessorID
- ProcessorLocation Name
- OrganizationID
- Body Part

To select the output criteria, select the appropriate check boxes and then click **OK**.

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17 Setting User Preferences

You can set preferences to customize your IntelliSpace PACS environment for your individual needs and work habits. There are three types of preferences:

- User preferences for the currently logged in user
- Systems preferences that affect every user (for IntelliSpace PACS System Administrators only) See 'Setting System Preferences' (see page 355).
- Machine preferences for settings related to the machine on which you are currently working. See 'Setting Machine Preferences' (see page 391).

Users can set the following preferences:

- **General Preferences**: See 'Setting General Preferences' (see page 338)
- **Mouse Preferences**: See 'Setting Mouse Preferences' (see page 340)
- **Window Width/Center**: See 'Setting Window Width/Center User Preferences' (see page 344)
- **Keyboard Shortcuts**: See 'Setting Keyboard Shortcut Preferences' (see page 346)
- **Image Processing**: See 'Setting Image Processing Preferences' (see page 346)
- **Display Preferences**: See 'Setting Display Preferences' (see page 350)
- **Applications Configuration:** See 'Setting Applications Configuration Rules' (see page 351)

Only IntelliSpace PACS System Administrators can set enterprise-wide preferences as well as computer-specific and account-specific settings. You may need to be familiar with this area to assist users who are trying to set their own preferences, to answer questions about system-wide settings, and to process requests for changes to those settings. System and machine preferences are only available to System Administrators and are not visible to standard users.

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WARNING ***If multiple users share the same User Preferences, IntelliSpace PACS cannot prevent the users from changing settings in each of the users' User Preferences.***

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Set the desired user preferences.
3. Click **Apply** to save the preference and continue setting user preferences. Click **OK** when you are done.

17.1 Setting General Preferences

Any user can set general preferences, regardless of their privileges.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip. The right side of the **Preferences** dialog box displays the current general preferences.

2. Optionally, set the following preferences. When you are done with each preference, click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.
   - Select the **Display Timeline** check box to show the Patient History Timeline when an exam is opened.
   - Select the **Display Key Image Stack** check box to display the Key Image Series at the beginning of each exam rack. The Key Image Stack enables you to view images in a study that have been flagged as significant. Key images are saved in Presentation States and can be flagged for a variety or reasons, including improving referring physician access by providing a way to focus on the most pertinent images in a study, teaching files, consultation, and image quality issues.
   - Select the **Automatically Display Exam Notes for unread main exams** check box to have IntelliSpace PACS automatically open the **Exam Notes** for the unread "main" exam of each Canvas Page if exam notes are available and the user has proper permissions. See 'Using Exam Notes' (see page 128).

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- Select the **Axial/Oblique CT** check box to automatically display axial and oblique CTs so that the anatomical right is displayed on the left, regardless of the initial orientation of the image. This setting is mostly applicable to CT's of the sinuses. This check box might not be sdisplayed if the System Administrator has disabled this option for the entire site.
- Select the **Open user's most recent presentation state** check box if you want this presentation state to be opened first.
- Select **Automatically connect to federation** to activate the Federation layer in the IntelliSpace PACS client, only if Federation is configured at the site. See section 3.8 'Setting Federation Status' on page 40.
- Select **Show Exceptions in Patient List** to enable searching for and displaying both exams and exceptions that match the search criteria in the Patient Lookup. (See 'Viewing Exceptions in the Patient Lookup' (see page 79).
- If desired, click **Change Password**. The **Change Password** dialog box displays. Enter the desired password changes and click **OK**.

3. Set the **Rack Orientation** to **Vertical** or **Horizontal** and the **Initial Size** to **Small** or **Normal**.
4. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

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17.2 Setting Mouse Preferences

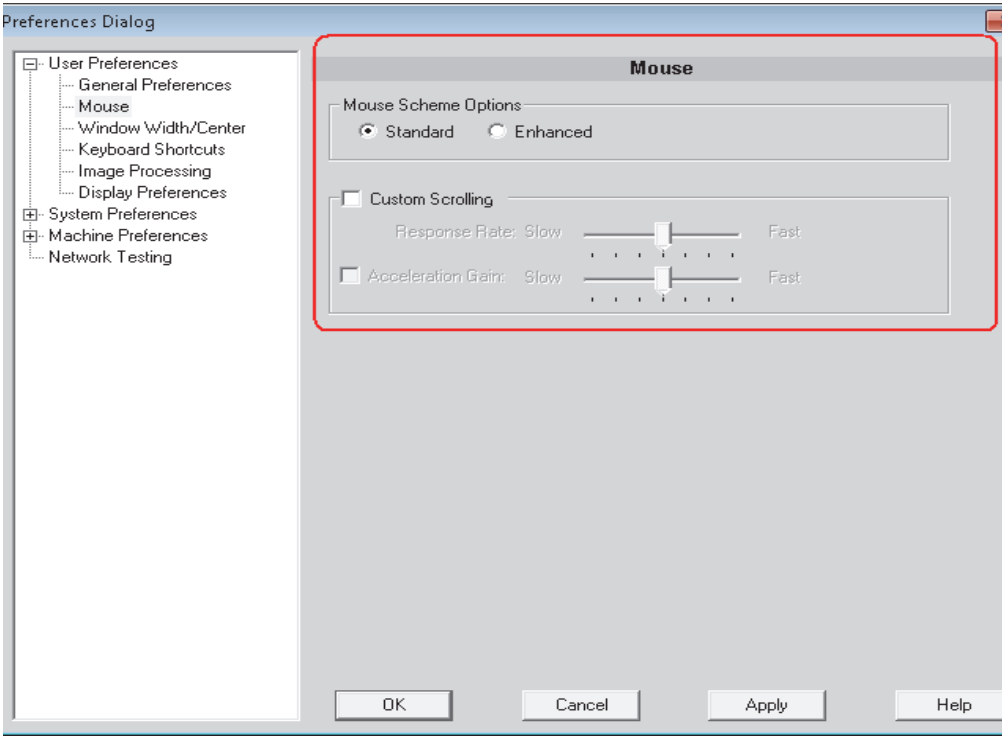
You set the behavior of the mouse in the **Mouse** Preferences dialog box. Two preferences are available:

- **Mouse Scheme Options**: Allows you to choose whether you want to use the standard mouse actions and cursor (**Standard**) or use cursors whose shape indicates their action (**Enhanced**). **Standard** is enabled by default. See 'Standard Mouse Scheme' (see page 401) and 'Enhanced Mouse Scheme' (see page 403).
- **Scrolling**: Uses the **Coarse Fast Cine** feature by default. Users who prefer to have images controlled by precise mouse movements can set **Custom Scrolling** options. See 'Scrolling' (see page 405).

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.

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2. Under User Preferences, click **Mouse**. The right side of the **Preferences** dialog box displays the mouse settings.



3. Set one of the following **Mouse Scheme Options**. If you do not want to use the default **Coarse Fast Cine** scrolling method, you can enable **Custom Scrolling** (it is disabled by default). With **Custom Scrolling**, you can define how precise image movements are controlled by mouse movements so that images are transitioned based on the distance the mouse travels. When you enable **Custom Scrolling**, the image stack begins to move immediately when the mouse moves and stops incrementing immediately when the mouse stops moving. based on the rate sets on the sliders (from slow to fast). When **Custom Scrolling** is enabled, **Coarse Fast Cine** is disabled. See 'Scrolling' (see page 405)

   - **Standard**: Select if you want to use the standard mouse actions and cursor. See 'Standard Mouse Scheme' (see page 401).

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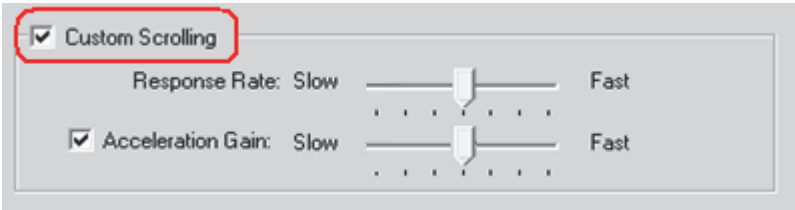
- **Enhanced**: Select if you want to use cursors whose shapes indicate their action, as follows. You can cycle through the cursor modes by double-clicking the middle mouse button or choosing a mode from a menu. You still double-click the left mouse button to select images and use click-drag to perform the mouse mode functions. Note that Scroll mode is only available for stack images. See 'Enhanced Mouse Scheme' (see page 403).

Cursor	Description
	Window Width/Level
	Pan
	Zoom
	Scroll
	Acceleration Gain

4. If desired, select the **Custom Scrolling** check box and move the **Response Rate** slider to the desired speed to set how many images will be displayed, based on the distance the mouse travels Note the following:
   - The distance of mouse movement directly correlates to the number of images that increment in the stack, after the entire image stack has been read into the IntelliSpace PACS memory.
   - When the slider is set in the middle position, the stack scrolls with a standard movement across the height of the display is approximately 900 images (assuming a 2560 x 2048 monitor in a Landscape position).

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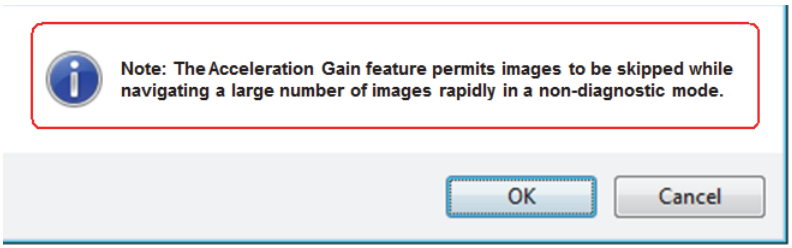
- By default, the slider is set to the middle position; **Slow** can go 30% lower and **Fast** can go 30% higher than the default Mouse Properties settings in Windows..



5. If desired, select the **Acceleration Gain** check box and move the slider to the desired acceleration sensitivity.

WARNING

When the Acceleration Gain option is selected, the cursor changes shape when a set of images is passed over and not shown to indicate that some image skipping is occurring. This is analogous to a flipping through the pages of a book to quickly get to the area of the book you want to begin to read. If you select the Acceleration Gain option, you must acknowledge the following message, which informs you that images may be skipped when navigating a large number of images. You control when skipping occurs by the rapidity with which you move the mouse. The cursor changes shape to indicate that images are being skipped during a non-diagnostic transversal of images. Click* OK *in this message to proceed.


Note: The Acceleration Gain feature permits images to be skipped while navigating a large number of images rapidly in a non-diagnostic mode.
OK
Cancel

6. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

NOTE

The calculations used by the sliders are based on default Mouse Properties settings for Windows on that machine. If the user changes these default settings, the relative values of Slow and Fast on the sliders are impacted. We recommend that users retain the default value for Mouse Properties in Windows when using this feature.

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17.3 Setting Window Width/Center User Preferences

You can create, edit, and delete Window Width/Center preferences for your own use; System Administrators can set Window Width/Center preferences for all IntelliSpace PACS users. See 'Setting Window Width/Center System Preferences' (see page 357). You can specify any modality but you must give a unique name to a new custom setting.

The Window Width/Center preferences allow you to configure an image for optimal viewing or to highlight certain details for better visibility. For example, changing the brightness or contrast of an image can allow you to more clearly view the part of the image you are most interested in. Separate preferences are available for modalities (for example, CT or MR) and for tissue (for example, bone or lung). These settings are mapped to the number keys (1 through 9) in the order listed in the **Preferences** dialog box, allowing you to quickly apply a Window Width/Center setting while viewing images.

When an image is first displayed, IntelliSpace PACS uses the modality's default WW/WL setting, if that information is available in the DICOM. When you modify or add **Window Width/Center** settings, IntelliSpace PACS uses these settings over the system default Window Width/Center preferences.

17.3.1 Adding a Window Width/Center Setting

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Under User Preferences, click **Window Width/Center**. The right side of the **Preferences** dialog box displays the current window width and center settings.
3. Click **Add**. The **Add Window Width/Center** dialog box displays.
4. Enter the desired **Name** for the new window width/center setting. You can put a number or letter in front of the name for easier sorting.
5. Select a **Modality** from the list.

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6. Enter values for the **Width** and **Center**.
7. Click **OK**. The preference is added to the list.
8. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

17.3.2 Editing a Window Width/Center Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Window Width/Center**. The right side of the **Preferences** dialog box displays the current window width and center setting.
3. Select a window width and center preference and either double-click it or click **Properties**. The **Edit Window Width/Center** dialog box displays.
4. Change the settings as desired.
5. Click **OK**. The modified preference is displayed in the Window Width/ Center list.
6. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

17.3.3 Deleting a Window Width/Center Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Window Width/Center**. The right side of the **Preferences** dialog box displays the current window width and center setting.
3. Select a window width and center preference and click **Delete**. The setting is deleted from the list.
4. Click **Apply** to save the settings and continue setting other preferences. If you delete all the User window and center settings, IntelliSpace PACS automatically restores the settings from the System window width and center settings. Click **OK** to save your changes and close the **Preferences** dialog box.

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17.4 Setting Keyboard Shortcut Preferences

You can set keyboard shortcuts to map keys and key combinations to IntelliSpace PACS actions. See 'Keyboard Commands' (see page 407) for a list of default keyboard shortcuts.

NOTE ***The following keyboard shortcuts are not editable:***

- ***Localizer Mode – F12***
- ***Scout Line Mode – F11***
- ***Single Image Window Level – L***
- ***Toggle Key Image – Space***
- ***Worklist/Canvas Page Refresh – F4***

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Keyboard Shortcuts**. The right side of the **Preferences** dialog box displays the keyboard shortcuts that have been configured.
3. To change a keyboard shortcut, select it and click **Edit**.
4. In the **Edit Keyboard Shortcut** dialog, click in the **Shortcut** field and press the keys or combinations of keys you want to assign to the selected action.
5. If you want to set the shortcut back to its original setting, click **Reset**.
6. Click **Restore Default Settings** to reset all shortcuts back to their original settings.
7. Click **OK**. A message displays if the keyboard shortcut is already being used for another action. If this happens, choose another keyboard shortcut that is not already in use.
8. Click **Apply** to save changes.

17.5 Setting Image Processing Preferences

You can set image processing preferences for edge enhancement, edge detection, median filters, and CLAHE.

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- The **Edge Enhancement** settings allow you to make the edges more prominent while still showing low frequency (background) information within the image. See 'Enhancing the Edges of an Image' (see page 239) to see how the **Edge Enhancement** preference is applied to images.
- The **Edge Detection** settings allow you to remove the low frequency (background) information from within the image, leaving only the edges visible. See 'Detecting the Edges of an Image' (see page 240) for information on how the **Edge Detection** preference is applied to images.
- The **Median Filter** settings allow you to define a low pass filter to remove "noise" from the image with little or no smoothing of the image. You can use the Median Filter preference to place a 3x3 or 5x5 mask over the original image. The median (medium) value becomes the new pixel value. See 'Filtering the Image' (see page 241) to see how the **Median Filter** preference is applied to images.
- The **CLAHE** (Contrast Limited Adaptive Histogram Equalization) settings utilize an adaptive form of histogram equalization that enhances the contrast adaptively across the image. See 'Using Contrast Limited Adaptive Histogram Equalization' (see page 242) to see how the **CLAHE** preference is applied to images.

When you modify or add **Image Processing** settings, IntelliSpace PACS uses these settings over the system default **Image Processing** preferences.

The **Edge Enhance** and **Edge Detect** preferences are applied to the entire series being viewed. A read-only list of active modalities is also available for each image processing preference. You can apply image processing filters using the menu. When an image processing filter is applied to an image, a "P" (Processed) icon is displayed in the metadata area of the image in the Exam Rack and in the image popup window.

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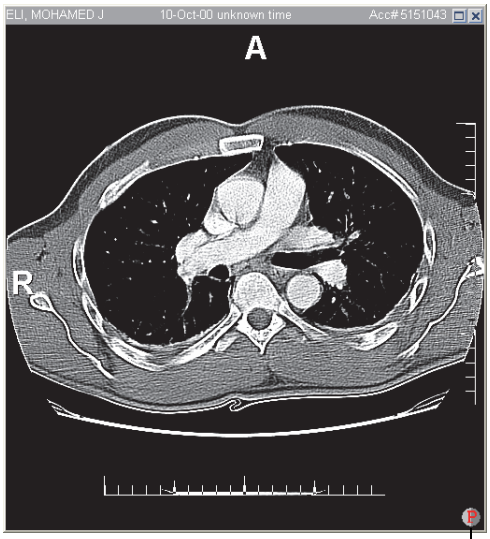


Figure 17.1 Image with processing filter applied

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Image Processing**. The right side of the **Preferences** dialog box displays a list of image processing options.
3. To set preferences for **Edge Enhance**, do one of the following:
   - Click **Method** and choose **5 pt Laplacian** or **9 pt Laplacian**.
   - Click **Degree** and choose **Light**, **Medium**, or **Strong**.
   - Click **Modalities** to view a read-only list of modalities.
4. To set preferences for **Edge Detect**, do one of the following:
   - Click **Method**. **Sobel** is the only choice. The Sobel operator scales the result and adds it back into the original image data.
   - Click **Degree** and choose **Light**, **Medium**, or **Strong**.
   - Click **Modalities** to view a read-only list of modalities.
5. To set preferences for **Median Filter**, do one of the following:
   - Click **Method** and choose **3x3 Filter** or **5x5 Filter.**

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- Click **Modalities** to view a read-only list of modalities.

6. To set preferences for **CLAHE**, do one of the following:
   - Set the **Contextual Region Dimension** to **32**, **64**, **96**, or **128**.
   - Set the **Number of Bins** to **256** or **384**.
   - Set the **Clip Limit** to **1.5**, **2.0**, **2.25**, **2.50**, **2.75**, or **3.0**.
   - Set the **Map Level** to **0**, **1**, or **2**.
7. Click **Modalities** to view a read-only list of modalities.
8. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

17.5.1 Restoring the Image Processing Preference Settings to the System Preferences Settings

If the System Administrator has changed the System preferences from their original settings, the new system preference values are applied.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Image Processing**. The right side of the **Preferences** dialog box displays a list of image processing options.
3. Click the method or degree you want to restore.
4. Click **Restore Defaults**. A confirmation message displays.
5. Click **Yes** to replace your Image Processing preferences with the system Image Processing preferences, or click **No** to keep your preferences.
6. Repeat steps 3 and 4 for each attribute to be changed (for example, **Edge Detect**). IntelliSpace PACS restores the User Image Processing preferences to the System Image Processing preference values.
7. Click **OK** to save changes and close the **Preferences** dialog box.

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17.6 Setting Display Preferences

You can set the various preferences in the **Display** section of the **Preferences** dialog box.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Display Preferences**. The right side of the **Preferences** dialog box displays a list of display options.
3. Set the **Screen Overlay Font Size** for diagnostic images to **Large**, **Medium**, or **Small**. The new font size is not used until you log out of IntelliSpace PACS and log back in. The value of each selection is determined by the Machine preferences font size settings. See 'Setting Display Monitor Preferences' (see page 393).
4. Set the **Cine Playback Resolution** for a stacked image window displayed in cine to **Full Resolution**, **512x512**, **256x256**, **128x128**, or select a **Default Cine Rate** (values between 1 and 45). This rate is applied for studies that do not supply a "Recommended Display" or "Cine Rate" in their metadata.
   - A clip captured at a resolution of 1024 x 1024 can be played back at a resolution of 256 x 256. When you do this, series play cine clip is loaded faster because there is less data retrieved from the server, but the quality is lower. You can improve the image quality by pressing <**F9**>. Note that the Popup Window Size is independent from the image resolution. This means that in the previous example, the initial Window Size might by 512 x 512. If the stack series is displayed at 256 x 256 it will be stretched to fit the window size. When you press <**F9**>, the additional image information is retrieved and the image quality is full fidelity for that window size, which is 512 x 512.
   - Set the frames per second playback rate for the **Default Cine Rate** from 1 to 45. If the "Recommended Display Frame tag (0008,2144)" is present, it is used as the initial frame rate. If this DICOM tag is not present, IntelliSpace PACS looks for the "Cine Rate" DICOM tag (0018,0040). If neither of these tags are present, the specified **Default Cine Rate** is used as the initial frame rate.

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5. Set the **Scout Line Mode** to **Single**, **Bracket**, or **All**. This setting determines how scout lines are displayed when the **Scout Line** tool is active and you click an image.
   - Select **Single** to show the location of the slice that is being reviewed.
   - Select **Bracket** to show the location of the slice being reviewed as well as two lines showing the limits of the series being reviewed.
   - Select **All** to show a single scout line, as well as a line for every slice in the series being reviewed.
6. Set the **Localizer Mode** to **No Scout Lines** or **Show Scout Lines**. This setting determines whether or not scout lines are displayed when the **Localizer** tool is active and you click on an image.
7. Set the following options for the **Magnifying Glass**. See 'Using the Magnifying Glass Tool' (see page 249).
   - The desired **Zoom** factor (between 150 and 1600).
   - The percentage of the hosting window that you want to magnify (5% to 80%).
8. Click **Apply** to save the settings and continue setting other preferences. Click **OK** when you are done.

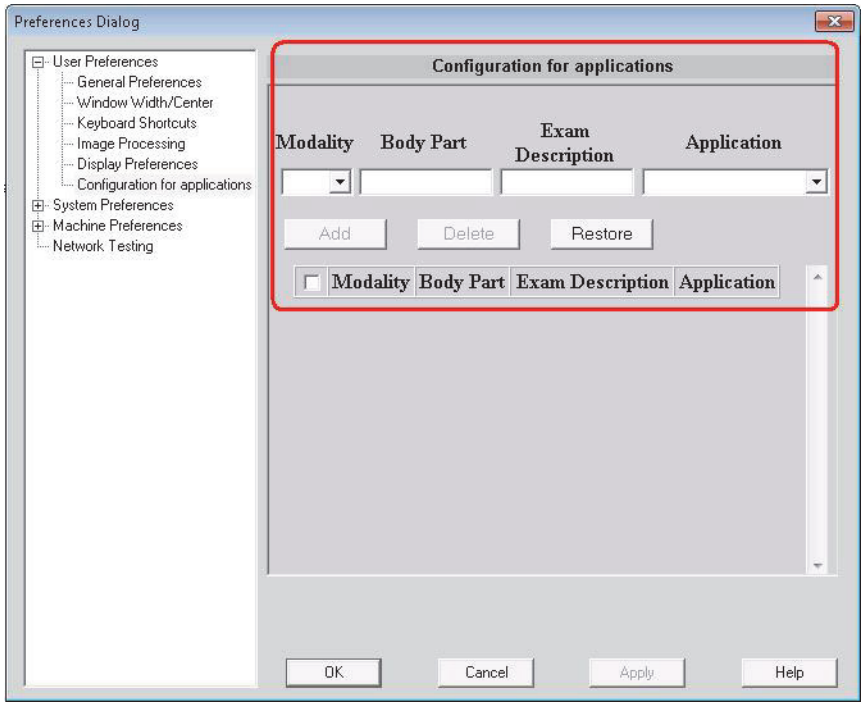
17.7 Setting Applications Configuration Rules

You can add and delete rules in the Preferences dialog in IntelliSpace PACS, only if Volume Vision is installed. To open this dialog, do the following:

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip. The Preferences dialog displays.
2. Click the **+** sign next to **User Preferences** in the Preferences dialog.

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3. Select **Configuration for Applications**. The Configuration for Applications panel displays in the right pane of the Preferences dialog.



17.7.1 Adding a Rule

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. In the **User Preferences** list, click **Configuration for Applications**. The Configuration for Applications panel displays in the right pane of the Preferences dialog.
3. Select a modality from the **Modality** dropdown list (Required).
4. Optionally, enter a body part in the **Body Part** text field, or leave the field empty.

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5. Optionally, enter an exam description in the **Exam Description** field, or leave this field empty.
6. Select an application from the **Application** dropdown list (Required).
7. Click **Add**.
8. To add another rule, perform Steps 3 through 6 of this procedure.
9. Click **OK** when you are done adding rules.

17.7.2 Deleting a Rule

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. In the **User Preferences** list, click **Configuration for Applications**. The Configuration for Applications panel displays in the right pane of the Preferences dialog.
3. Select the check box of the rule(s) that you want to delete.

NOTE ***To select all rules, select the check box to the left of the word 'Modality' in the middle of the Configuration for Applications panel.***

4. Click **Delete**.
5. To restore a deleted rule, click **Restore**.
6. Click **OK** when you are done deleting rules.

- **Study Comments**
- **Reason for Study**

17.8 Importing All and Exporting All User Preferences

You can import all and export all the following preferences:

- **Window Width/Center**
- **Image Processing**

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Importing preferences overrides any preferences in the system. A warning message displays when you import preferences.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Select one of the previously specified User Preferences in the preference tree.
3. Right-click the preference. From the menu, choose either the **Import All** or **Export All** option.
   - When you select **Import All**, the following message displays: "Importing preferences will override the existing preferences. Do you want to continue?" Click **Yes** and the Open dialog displays, prompting you to select the specific .xml file to import.
   - When you select **Export All**, The **Save As** dialog displays, and you are prompted to save the specific .xml file that corresponds to the preference group you have selected.

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18 Setting System Preferences

System Administrators can set preferences to customize IntelliSpace PACS for individual needs and work habits. There are two types of preferences System Administrators can set:

- Systems preferences that affect every user.
- Machine preferences for settings related to the machine on which you are currently working. See 'Setting Machine Preferences' (see page 391).

System Administrators can set the following System preferences:

- **General Preferences**: See 'Setting General Preferences' (see page 356)
- **Window/Width Center**: See 'Setting Window Width/Center System Preferences' (see page 357)
- **Image Processing**: See 'Setting Image Processing Preferences' (see page 359)
- **Annotations**: See 'Setting Annotation Preferences' (see page 362)
- **DICOM Sources**: See 'Setting DICOM Sources Preferences' (see page 364)
- **Screen Overlays**: See 'Setting Screen Overlay Preferences' (see page 372)
- **Paper Printing**: See 'Setting Paper Printing Preferences' (see page 377)
- **iExport**: See 'Setting iExport Preferences' (see page 380)
- **iQuery**: See 'Setting iQuery Preferences' (see page 382)
- **Plug-Ins**: See 'Setting Plug-In Preferences' (see page 384)
- **Patient Columns**: 'Setting Patient Columns Preferences' (see page 389)
- **Workflow:** See 'Setting Workflow Preferences' (see page 386)
- **Ensure All Viewed:** See 'Setting Ensure All Viewed Preference' (see page 387)

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.

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2. In the **Preferences** dialog box, click the **+** sign to display the list of System Preferences.
3. Set the desired system preferences.
4. Click **Apply** to set a preference and continue setting other preferences. Click **OK** when you are done.

18.1 Setting General Preferences

System Administrators can set the General system preferences that control the logon welcome message, variance for image/series linking, and other options.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **General Preferences**. The right side of the **Preferences** dialog box displays the current general preferences.
4. If desired, enter a new **Logon welcome message**. You can use this message to display Help Desk information or to notify users of scheduled maintenance to IntelliSpace PACS.
5. Enter the text for the message users see the first time they attempt to perform an action on a patient who has been designated as a VIP patient. This message can be up to three lines. See 'Working with VIP Patients' (see page 59).
6. In **Image/Series Linking**, select the number of degrees (up to 40 degrees) to allow for linking variance. This preference is primarily used to link oblique series that deviate up to 40 degrees from a true plane (Axial, Coronal, or Sagittal) with series that are oriented with a true plane.
7. In **Options**, you can select the following:
   - Select the **Allow DICOM Query from Exam** check box if you want to enable DICOM queries from the exam using the iQuery tool.

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- Select the **Automatically apply VOI LUT when available** check box to enable auto-selection of the first VOI LUT included in the image.

8. In **Image Orientation**, select the **Enable user preference for automatically flipping of Axial/Oblique CT images** check box if you want individual users to be able to set their own flipping preferences. IntelliSpace PACS automatically flips any axial CTs or oblique views that are up to 22.5 degree variance from the true axial plane where the patient's anatomical right is displayed on the right side of an image as in an acquisition where the patient is in prone position. This standard behavior is useful for users viewing CT Sinus studies where IntelliSpace PACS automatically flips to the most preferred viewing orientation.

   - In **Image Orientation**, select the **Axial Oblique CT: Anatomical right on left side of image window** check box if you want Axial and Oblique CTs to always be displayed with the anatomical right on the left side of the image.

9. In the **Clinical Info Source** area, specify whether information for Patient Comments or Patient History comes from DICOM or Clinical Exam Notes (RIS). Choose one of the following:

   - -**Main Exam's Comments**: Select **DICOM** or **Clinical Exam Notes**. The Patient Comments DICOM tag is (0010,4000).
   - **Main Exam's History**: Select **DICOM** or **Clinical Exam Notes**. The History DICOM tag is (0010,21B0).

10. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.2 Setting Window Width/Center System Preferences

System Administrators can create, edit, and delete the system supplied Window Width/Center preferences. Individual users can also create their own Window Width/Center preferences, which will override the system settings. See 'Setting Window Width/Center User Preferences' (see page 344).

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The Window Width/Center preferences allow you to configure an image for optimal viewing or to highlight certain details for better visibility. For example, changing the brightness or contrast of an image can allow you to more clearly view the part of the image you are most interested in. Separate preferences are available for modalities (for example CT or MR) and for tissue (for example, bone or lung). When an image is first displayed, IntelliSpace PACS uses the modality's default WW/WL setting, if that information is available in the DICOM.

Window Width/Center settings are mapped to the number keys in the order listed in the **Preferences** dialog box, allowing you to quickly apply a Window Width/Center setting while viewing images. For each setting, IntelliSpace PACS displays the name, modality, width, and center (for example, Brain, CT, 80, 35). You can have up to 100 setting saved.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Window Width/Center**. The right side of the **Preferences** dialog box displays the current window width and center settings.
4. Click **Add**. The **Add Window Width/Center** dialog box displays.
5. Enter the desired **Name** (up to 20 characters) for the new window width/center setting.
6. Select a **Modality** from the list.
7. Enter values for the **Width** and **Center**.
8. Click **OK**. The new preference is displayed in the **Window Width/Center** list.
9. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

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18.3 Editing a Window Width/Center Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Window Width/Center**. The right side of the **Preferences** dialog box displays the current window width and center setting.
4. Select a setting in the list and click **Properties** or double-click the setting in the list. The **Edit Window Width/Center** dialog box displays.
5. Change the settings as desired.
6. Click **OK**. The modified preference is displayed in the **Window Width/Center** list.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.3.1 Deleting a Window Width/Center Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Window Width/Center**. The right side of the **Preferences** dialog box displays the current window width and center setting.
4. Select a window width and center preference and click **Delete**. The setting is deleted from the list.
5. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.4 Setting Image Processing Preferences

System Administrators can set the default image processing preferences for edge enhancement, edge detection, median filters, and CLAHE.

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- The **Edge Enhancement** settings allow you to make the edges more prominent while still showing low frequency (background) information within the image. See 'Enhancing the Edges of an Image' (see page 239) to see how the **Edge Enhancement** preference is applied to images.
- The **Edge Detection** settings allow you to remove the low frequency (background) information from within the image, leaving only the edges visible. See 'Detecting the Edges of an Image' (see page 240) for information on how the **Edge Detection** preference is applied to images.
- The **Median Filter** settings allow you to define a low pass filter to remove "noise" from the image with little or no smoothing of the image. You can use the Median Filter preference to place a 3x3 or 5x5 mask over the original image. The median (medium) value becomes the new pixel value. See 'Filtering the Image' (see page 241) to see how the **Median Filter** preference is applied to images.
- The **CLAHE** (Contrast Limited Adaptive Histogram Equalization) settings utilize an adaptive form of histogram equalization that enhances the contrast adaptively across the image. See 'Using Contrast Limited Adaptive Histogram Equalization' (see page 242) to see how the **CLAHE** preference is applied to images.

Images/studies with **Image Processing** filters cannot be printed to film as diagnostic-quality images because these filters alter the digital data of the original DICOM.

These preferences are applied to the entire series being viewed. A read-only list of active modalities is also available for each image processing preference. You can apply image processing filters using the menu. When an image processing filter is applied to an image, a "P" (Processed) icon is displayed in the metadata area in the Exam Rack and in the image popup window.

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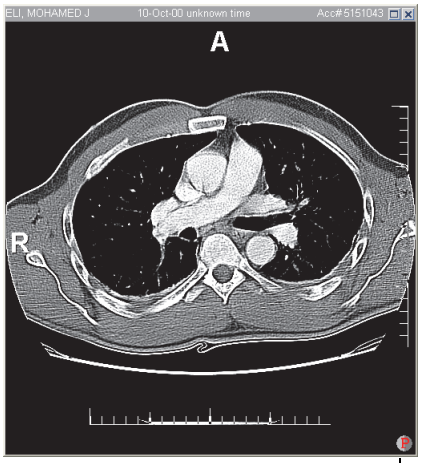


Figure 18.1 Image with Image Processing icon

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Image Processing**. The right side of the **Preferences** dialog box displays a list of image processing options.
4. To set preferences for **Edge Enhance**, do one of the following:
   - Click **Method** and choose **5 pt Laplacian** or **9 pt Laplacian**.
   - Click **Degree** and choose **Light**, **Medium**, or **Strong**.
   - Click **Modalities** to view a read-only list of modalities.
5. To set preferences for **Edge Detect**, do one of the following:
   - Click **Method**. **Sobol** is the only choice. The Sobol operator scales the result and adds it back into the original image data.
   - Click **Degree** and choose **Light**, **Medium**, or **Strong**.
   - Click **Modalities** to view a read-only list of modalities.
6. To set preferences for **Median Filter**, do one of the following:
   - Click **Method** and choose **3x3 Filter** or **5x5 Filter**.

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- Click **Modalities** to view a read-only list of modalities.

7. To set preferences for **CLAHE**, do one of the following:
   - Set the **Contextual Region Dimension** to **32**, **64**, **96**, or **128**.
   - Set the **Number of Bins** to **256** or **384**.
   - Set the **Clip Limit** to **1.5**, **2.0**, **2.25**, **2.50**, **2.75**, or **3.0**.
   - Set the **Map Level** to **0**, **1**, or **2**.
8. Click **Modalities** to view a read-only list of modalities.
9. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.5 Setting Annotation Preferences

System Administrators can set preferences for images to be annotated by physicians or Radiologists. IntelliSpace PACS has 10 pre-defined annotations, which is also the limit on the number of custom annotations. Therefore, before you can add a custom annotation to your preferences, you need to delete one of the 10 existing annotations. You can specify various font and arrow styles for annotations. See 'Annotating Images' (see page 277).

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Annotations**. The right side of the **Preferences** dialog box displays a list of annotation preferences and buttons that allow you to add, edit, or delete annotations.
4. Click **Add**. The **Add Annotation** dialog box displays.
5. Enter a name for the annotation. This name is displayed as an annotation option in the menu.
6. Click **Font** if you want to change the font style and size for the annotation.
7. If you want the annotation to include an arrow, select the **Arrow** check box and specify the **Line Size** and **Line Style** for the arrow.

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8. Click **OK**. The annotation is added to the list in the **Preferences** dialog box.
9. Click **Apply** to save the annotation preference and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.5.1 Editing an Annotation Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Annotations**. The right side of the **Preferences** dialog box displays a list of annotation preferences and a **Properties** button that allow you to edit annotations.
4. Select the annotation you want to edit and click **Properties**, or double-click the annotation. The **Edit Annotation** dialog box displays.
5. Change the properties of the annotation as desired.
6. Click **OK**. The modified annotation is added to the list in the **Preferences** dialog box.
7. Click **Apply** to save the annotation preference and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.5.2 Deleting an Annotation Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Annotations**. The right side of the **Preferences** dialog box displays a list of annotation preferences and a Delete button that enables you to delete annotations.
4. Select the annotation you want to delete and click **Delete**. The annotation is removed from the list.

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5. Click **Apply** to save the deletion and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.6 Setting DICOM Sources Preferences

You can set DICOM Sources preferences to configure defaults for Window Center, Series Splitting, Presentation State, Collection, and Series and Image Sorting based on a specific modality or modality type. You can also stack images coming from RF, US, or XA.

DICOM sources must have unique values. If a DICOM source has the same number of selected identifiers and the same exam values within the identifiers, an error is displayed stating that the DICOM source already exists.

The DICOM Sources feature is only applied for single-frame modality images, not for multi-frame modality images. You can set up DICOM sources for a specific DICOM source or a generic DICOM source for each modality's images.

NOTE ***IntelliSpace PACS does not process studies larger than 3-4 GB in raw DICOM data.***

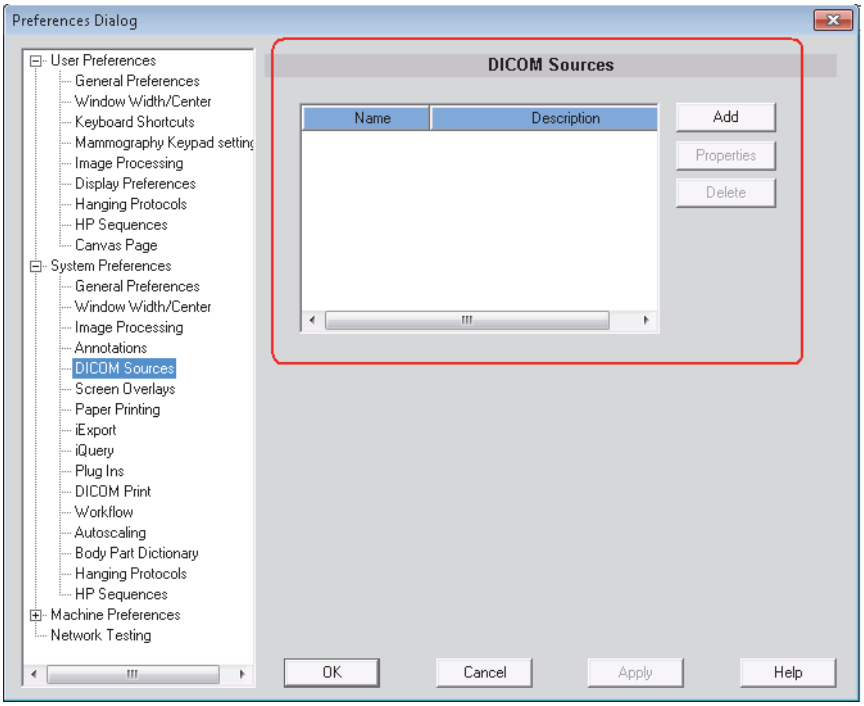
DICOM Source sorts series and images within a study rack as follows:

- First, the stacked series are sorted by the image sorting criteria defined in the DICOM Source or by Image Number. This defines which image is at the top of each stacked series.
- To sort the series across the rack, IntelliSpace PACS sorts by the series sort criteria defined in the DICOM Source. If that is identical (such as all series having the same series number), then IntelliSpace PACS sorts the series by descending series date/time (this is a hard coded secondary sort criteria). If the series also shares identical series date/time (as in digitally scanned films or time delay fluoroscopy images which often have the same values in the series level metadata), you can use an option to bypass the series sort criteria and use the image sorting criteria directly for sorting series display within a study rack.

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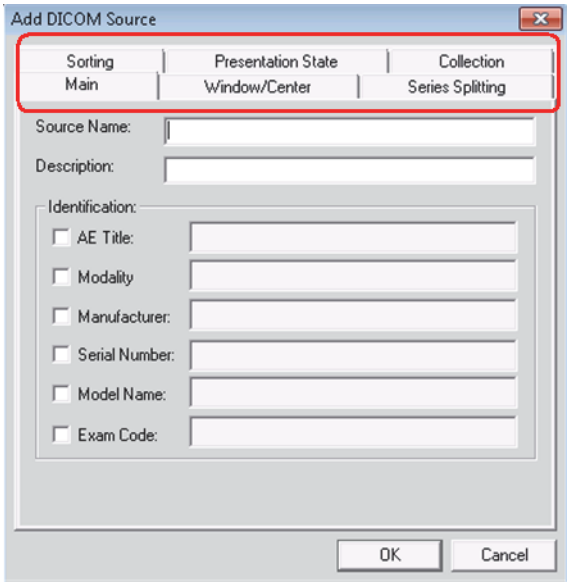
WARNING ***In the Add DICOM Source dialog box for Color WW/WL Settings, enabling any non-zero deviation value can cause alteration of true colors. Attempting to select a non-zero deviation value will cause the message "Setting a deviation value other than 0 can alter true color values" to display. You should also exercise caution when using this feature with scanned-in images.***

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays, sorted alphabetically by name.
3. Click **DICOM Sources**. The right side of the **Preferences** dialog box displays a list of DICOM sources and buttons that allow you to add, edit, or delete DICOM sources.



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4. Click **Add**. The **Add DICOM Source** dialog box displays.



5. This dialog box has six tabs: **Main**, **Window/Center**, **Series Splitting**, **Sorting**, **Presentation State**, **and Collection**. You must fill in the information on each tab to adequately identify and properly link DICOM sources. You should be as specific as possible to prevent overlapping DICOM sources.
6. In the **Main** tab, enter the **Source Name** and **Description** for the DICOM source.
   - Philips recommends that the **Source Name** matches the ID field in the DICOM metadata.
   - Philips recommends that the **Description** summarizes the function of the DICOM source (such as “Slice Thickness Series Splitting”).
7. In the **Identification** section, select each check box for which you have information. To add a generic DICOM Source, only select and complete the **Modality** field. If two or more DICOM sources are configured with an equal

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number of matching Identifiers, the DICOM source containing an Exam Code takes precedence and is applied over the DICOM source that does not contain an Exam Code.

- In the **AE Title** field, enter the name of the Application Entity, DICOM tag (0073,1003).
- In the **Modality** field, enter the DICOM assigned modality type acronym, such as MR for Magnetic Resonance Imaging in DICOM tag (0008,0060).
- In the **Manufacturer** field, enter the manufacturer's name that appears in the DICOM metadata, DICOM tag (0008,0070).
- In the **Serial Number** field, enter the serial number that appears in the DICOM metadata, DICOM tag (0018,1000). If your DICOM metadata does not provide a serial number, you should leave the box clear.
- In the **Model Name** field, enter the model that appears in the DICOM metadata, DICOM tag (0008,1090).
- In the **Exam Code** field, enter the desired code from the Exam Dictionary. This option lets you specify a specific series display, such as series splitting, that is only applicable to a specific exam code.

8. Click the **Window/Center** tab and enter the values you wish to use for this source.
   - Select **Histogram calculation** to use a graph showing the total tonal distribution in the image. It maps Luminance, which is defined from the way the human eye perceives the brightness of certain colors. Every pixel in the color or gray image computes to a luminance value between 0 and 255. The histogram uses bins to graph the pixel count of every possible value of luminance or brightness. The total tonal range of a pixel's 8-bit tone value is 0 to 255, where the 0 is the blackest at the left end and 255 is the whitest at the right end.
   - Select **DICOM Values**, which are the Window Width/Center values provided by the modality. DICOM sources utilizing DICOM values should be configured for a specific AE Title to ensure that images from other devices are not impacted. The DICOM modality values are stored

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in Window Center (0028,1050) and Window Width (0028,0151) DICOM attributes. Without these values, IntelliSpace PACS applies a histogram calculation that may be less desirable than what the Technologist acquired the image with.

- Select **Fixed Values** and enter the **Width** and **Center** to define values that are applied automatically every time. This is most useful when using **Exam Code** level as a DICOM source.
- For Lossless images you can select whether to enable simulated grayscale WW/WL and specify a deviation value from true gray from 0 to 3. For Lossy images, you can select whether to enable simulated grayscale WW/WL and specify a deviation value from true gray from 0 to 32. If you select one of these check boxes, the **Restore Color Image** option is added to the WW/WL menu to enable you to restore the original RGB presentation of the image. Note that selecting a non-zero threshold is audited and you must acknowledge a warning message stating that this feature can alter true color values.
  Grayscale is represented in an RGB image by having the R, G, and B values identical, and in the range of 0 to 255, inclusive. The simulated grayscale WW/WL filters values that have identical RGB and treats them as a grayscale value, and replaces the RGB values with the newly computed WW/WL value. Due to noise from the scanner or degradation from lossy compression, values you may wish to interpret as grayscale deviate from an exact RGB representation. This deviation is treated as a parameterized deviation in the DICOM source so you can adjust the sensitivity to true gray to meet your needs.

9. Click the **Series Splitting** tab and specify how you would like to split series in the exam rack. For example, you might want to create separate image windows for monochrome versus color images. You can also right-click the exam menu on the rack to split the series on a per study basis. You cannot remove the following default attributes and tags, which are preconfigured and available for series splitting:

Attribute	Tag	Description
SOP Instance UID	0008,0018	The unique identifier of the SOP instance.

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Attribute	Tag	Description
Contrast/Bolus Agent	0008,0010	The Contrast or Bolus agent used.
Scanning Sequence	0008,0020	Description of the type of data taken. Enumerated values: SE = Spin Echo IR = Inversion Recovery GR = Gradient Recalled EP = Echo planar RM = Research Mode (Not all search combination are valid.)
Slice Thickness	0008,0050	Nominal slice thickness in mm.
Echo Time	0008,0081	Time in ms between the middle of the excitation plus and the peak of the echo produced.
Echo Number(s)	0008,0086	The echo number used in generating this image. In the case of segmented k-space, it is the effective Echo Number.
Convolution Kernel	0008,1210	A label describing the convolution kernel or algorithm used to reconstruct the data.
Acquisition Number	0020,0012	A number identifying a single contiguous gathering of data over a period of time that resulted in this image.
Rows	0028,0010	
Columns	0028,0011	

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10. Click **Add Attribute** if you want to use a different DICOM tag than the defaults for series splitting. The **Enter Tag** dialog box displays.
11. Enter the desired tag ID after the 0x and click **OK**. The DICOM tag is displayed in the list alphabetically. Series are split by rows and columns so that the system will not create a stack with differently sized images.
12. Click the **Sorting** tab to set how the studies and series coming from this DICOM source are sorted. Set the desired sorting options for **Series Sorting** and **Image Sorting**. To sort only by image criteria, not series criteria, select **Image Sorting Criteria Only**.
13. Click the **Presentation State** tab. The settings in this tab determine whether to display or hide some or all of the DICOM overlay planes when loading a GSPS. It specifies how IntelliSpace PACS interprets the overlay activation module in GSPS. **Overlay Activation** defines a way to control whether or not bit-mapped overlay information is displayed. The settings in this tab are only used when loading GSPS. If desired, under **Overlay Activation**, select the check box for **Initially display incorrectly specified overlays**. This setting is useful for sites that have applications that do not generate GSPS with correct overlay activation layer tags (60xx,1001). When selected, IntelliSpace PACS ignores the overlay activation tags that are present or missing in the GSPS created by an application that matches the DICOM Source and displays all overlay planes. If **Initially display incorrectly specified overlays** is not selected, IntelliSpace PACS client honors the overlay activation layer tags when loading GSPS. When a GSPS for an image that has DICOM overlays is loaded, IntelliSpace PACS only displays those overlay planes for which the overlay activation layer tag in the GSPS instance has some non-zero length value. IntelliSpace PACS does not display those overlay planes for which the overlay activation layer tag has no value or if the overlay activation tag is missing altogether. However, all overlay planes will be displayed when the display of overlays is toggled off and on using the shortcut keys for **Show/Hide All Overlays** or **Show/Hide Bit Overlays**. See 'Keyboard Commands' (see page 407).
14. Click the **Collection** tab to enable **Auto collect series**. Selecting this option causes all series with less than or equal to the number of specified images in the exam to be added to a single collection by default, in the order of

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acquisition. The **Number of images** box specifies the maximum number of images that a series can have for it to be auto-collected. Enter the number (between 1 and 200) in the box.

15. Select **Auto play collection**; this causes the collection to start auto-playing the rest of the images in the collection when the user starts scrolling through the current image in the collection. When the **Loop within series** check box is selected, it causes the auto-play to loop back to the beginning of the series after the last image in the series has been displayed, rather than moving to the next series in the collection. This box is checked by default.
16. When you have finished making your selections, click **OK**. If the DICOM Source is a duplicate a message displays.
17. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.6.1 Editing a DICOM Source

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **DICOM Sources**. The right side of the **Preferences** dialog box displays a list of DICOM sources and a **Properties** button that allow you to edit DICOM sources.
4. Select the DICOM source you want to edit and click **Properties**, or double-click the DICOM source. The **Edit DICOM Source** dialog box displays. This dialog box has six tabs: **Main**, **Window/Center**, **Series Splitting**, and **Sorting**, **Presentation State**, and **Collection**. You must fill in the information on each tab to adequately identify and properly link DICOM sources to IntelliSpace PACS.
5. Edit the settings as desired.
6. Click **OK**. If the DICOM Source is a duplicate a message displays.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

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18.6.2 Deleting a DICOM Source

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **DICOM Sources**. The right side of the **Preferences** dialog box displays a list of DICOM sources and buttons that allow you to add, edit, or delete DICOM sources.
4. Select the DICOM source you want to delete and click **Delete**. The DICOM source is removed from the list.
5. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.7 Setting Screen Overlay Preferences

System Administrators can configure and modify preferences for overlays for various modalities, and specify where various patient and exam information will display in the four corners of each image/series frame. You can add a total of 50 overlays to images, meaning approximately 12 overlay items per corner. Each overlay must have a unique name. You can also do the following when configuring screen overlays:

- Create custom DICOM tags for screen overlay text or modify existing DICOM tag names and values.
- Set the screen font for overlay text.s
- Set up a basic design for screen overlays for a modality and export the overlays as an .xml file to be used as a template. You can then import and customize the overlays for different modality types.

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Note the following:

- Magnetic Resonance Imaging modalities supply a number of overlays which are useful for physicians to have in gaining better tissue characterization. IntelliSpace PACS displays these MR overlays in conformance with traditional format that clinicians are used to. IntelliSpace PACS enhances support for MR specific tags as follows:
  - Scan Options (0018,0022) and Scanning Sequence (0018,0020): IntelliSpace PACS displays multi-values separated by a "/"
  - Magnetic Field Strength (0018,0087): IntelliSpace PACS displays MR Magnet value in Tesla.
  - Slice Gap as a Calculated Screen Overlay: The Slice Gap is calculated by the difference between the slice thickness (0018,0050) and the slice spacing (0018,0088). Note that this also applies to CT.
- IntelliSpace PACS displays the value for the 0019,1015 tag on the overlays via the CR Dose overlay. This means that if you select this overlay for an image, IntelliSpace PACS checks to make sure that it is an AGFA CR. If it is, the value received from the private tag 0019,1015 is displayed.
- The following pre-defined screen overlays are available for MG images:

Label / Name	String Value	Comment
KVP	((00180060)) kV	
Exposure	((00181152)) mAs	
Exposure Time	((00181150)) ms	
Filter Material	((00187050)) Filter	
Anode Target Material	((00181191)) Anode	
Compression Force	((001811A2)) N	
Body Part Thickness	((001811A0)) mm	
Entrance Dose (mGy)	((00408302)) mGy	
Mean Glandular Dose (dGy)	((00400316)) dGy	Up to the 3rd decimal place

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Label / Name	String Value	Comment
Orientation		This Orientation tag looks for the Image Laterality tag (0020,0062) and the Orientation Tag (0018,5101). If the Orientation tag (0018,5101) is not present, IntelliSpace PACS checks for the presence of DICOM tag (0054,0220) for View Code Sequence and its sub-tag (0008,0104) for Mammography orientation display. Subsequently, IntelliSpace PACS supports DICOM sub-tags. IntelliSpace PACS displays both the Laterality and the Orientation on the same line. Screen overlays on MG images are displayed on the outside of the image, taking into account the image laterality, patient orientation, and image horizontal flip. This prevents overlays from displaying over the image.

- The Field of View for DICOM tag (0018,1100) is a diameter measurement of a region within the original dataset from which reconstruction of an image was derived. The original data and/or patient may exist outside of this region. In other systems and the film environment, this value is displayed in centimeters, even though the DICOM value is in millimeters. The calculated tag FOV/Recon Diameter looks at DICOM (0018,1100) but displays the equivalent values in centimeters. IntelliSpace PACS System Administrators can use the separate tag “Recon Diameter (mm)” to display the original DICOM value in millimeters.
- The Custom tag allows IntelliSpace PACS Administrators to customize a specific tag which may not have been already pre-defined by IntelliSpace PACS. Administrators define a known DICOM tag for configuration.
- The label of an item in the screen overlay is not shown if the item has no value in the DICOM data. However, for a label that comprises multiple items, the labels of all items are displayed if at least one item has a value.

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1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Screen Overlays** The right side of the **Preferences** dialog box displays a list of current overlays for modalities, and allows to add, edit, delete, export, or import overlays.
4. Click **Add**. The **Overlay** dialog box displays the available overlay options and a default screen overlay. You can add a total of 50 overlays to images, meaning approximately 12 overlay items per corner. A line can contain multiple overlays (for example, name and sex on a single line). Blank lines are displayed if the information for that overlay is not available.
5. Enter a name for the overlay. The name must correspond to a modality type (for example, CR or US).
6. Select the desired overlay text from the tree control on the right side of the **Overlay** dialog box, and drag it to the screen mockup on the left side. Remove overlay text by selecting and dragging it off the screen mockup. You can only place overlay text on one of the screen's corners, not in the center of the image. Selected overlays are outlined with a red box.
7. Click **Font** to change the display font for overlays in IntelliSpace PACS. The **Font** dialog box displays. Select a font from the list and click **OK**. You return to the **Overlay** dialog box.
8. You can double-click overlay text in the screen mockup to view the DICOM tag for that text, and to change the font weight and size. To add a custom DICOM tag, double-click an overlay field and enter the new **Name** and **Value** in the **Tag Edit** dialog box. The value corresponds to the DICOM metadata field which carries the information in question. For instance number, always use the DICOM Tag-Image Number - 0020,0013. As required, select the Font Weight and Relative Font Size. Click **OK** when you are done. You return to the **Overlay** dialog box.
9. When you have finished laying out the overlay text, click **OK**. You return to the **Preferences** dialog box.
10. To show the Bit Overlays by default, set the **Show by default** check box.

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11. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.7.1 Editing a Screen Overlay

1. Display the **Screen Overlay** section of the System preferences.
2. Select the overlay you want to edit and click **Properties**, or double-click the overlay. The **Overlay** dialog box displays the properties of the selected overlay.
3. Select the desired overlay text from the tree control on the right side of the **Overlay** dialog box, and drag it to the screen mockup on the left side. Remove overlay text by selecting and dragging it off the screen mockup. You can only place overlay text on one of the screen's corners, not in the center of the image. Selected overlays are outlined with a red box.
4. Click **Font** if you want to change the display font for overlays in IntelliSpace PACS. The Font dialog box displays. Select a font from the list and click **OK**. You return to the **Overlay** dialog box.
5. You can double-click overlay text in the screen mockup to view the DICOM tag for that text, and to change the font weight and size. To add a custom DICOM tag, double-click an overlay field and enter the new **Name** and **Value** in the **Tag Edit** dialog box. The value corresponds to the DICOM metadata field which carries the information in question. For instance number, always use the DICOM Tag-Image Number - 0020,0013. As required, select the Font Weight and Relative Font Size. Click **OK** when you are done. You return to the **Overlay** dialog box.
6. When you have finished laying out the overlay text, click **OK**. You return to the **Preferences** dialog box.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.7.2 Deleting a Screen Overlay

1. Display the Screen Overlay section of the System preferences.
2. Select the overlay you want to delete and click **Delete**. The overlay is removed from the list.

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3. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.7.3 Exporting a Screen Overlay

1. Display the Screen Overlay section of the System preferences.
2. Select the overlay you want to export and click **Export**. The **Save As** dialog box displays.
3. Enter a name for the overlay and click **Save**. The file is saved in .xml format in the chosen directory and you return to the **Preferences** dialog box.

18.7.4 Importing a Screen Overlay

1. Display the Screen Overlay section of the System preferences.
2. Click **Import**. The **Open** dialog box displays, allowing you to find the .xml overlay file you want to import.
3. Find and select the .xml file and click **Open**. A message displays, asking you to confirm importing the file.
4. Click **OK** to import, or **No** to cancel.
5. The imported overlay is added to the list in the **Preferences** dialog box.

18.8 Setting Paper Printing Preferences

System Administrators can create unique print configurations that users can select to specify exactly how image metadata is printed as an overlay. You can save up to 10 print configurations. The overlays you configure here only apply to paper output, not to the overlays displayed on the screen or used in DICOM printing. See 'Printing to Paper' (see page 302).

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Paper Printing**. The right side of the **Preferences** dialog box displays a list of the current paper printing preferences.

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4. Click **Add**. The **Add Windows Print Configuration** dialog box displays.
5. Enter the **Name** of the print configuration.
6. Select a **Format** from the list.
7. To configure the overlay for paper printing, click **Overlay**. The **Overlay** dialog box displays the available overlay options and a default screen overlay. You can add a total of 50 overlays to images, meaning approximately 12 overlay items per corner. A line can contain multiple overlays (for example, name and sex on a single line).
8. Select the desired overlay text from the tree control on the right side of the **Overlay** dialog box, and drag it to the screen mockup on the left side. Remove overlay text by selecting and dragging it off the screen mockup. You can only place overlay text on one of the screen's corners, not in the center of the image. Selected overlays are outlined with a red box.
9. Click **Font** if you want to change the display font for overlays printed on paper. The **Font** dialog box displays. Select a font from the list and click **OK**. You return to the **Overlay** dialog box.
10. You can double-click overlay text in the screen mockup to view the DICOM tag for that text. To add a custom DICOM tag, double-click an overlay field and enter the new **Name** and **Value** in the **Tag Edit** dialog box. The value corresponds to the DICOM metadata field which carries the information in question. For instance number, always use the DICOM Tag-Image Number - 0020,0013. Click **OK** when you are done. You return to the **Overlay** dialog box.
11. Click **OK** to return to the **Add Windows Print Configuration** dialog box.
12. When you have finished configuring the overlay, click **OK**. You return to the **Preferences** dialog box.
13. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.8.1 Editing a Paper Printing Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.

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2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Paper Printing** The right side of the **Preferences** dialog box displays a list of the current paper printing preferences.
4. Select the paper printing preference you want to edit and click **Properties**, or double-click the printing preference. The **Edit Windows Print Configuration** dialog box displays.
5. Make the desired changes to name, format, and overlay settings.
6. Click **OK**. You return to the **Preferences** dialog box.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.8.2 Exporting a Paper Printing Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Paper Printing** The right side of the **Preferences** dialog box displays a list of the current paper printing preferences.
4. Select the printing preference you want to export and click **Export**. The **Save As** dialog box displays.
5. Choose the desired Save In directory, enter a name for the printing preference, and click **Save**. The file is saved in .xml format in the chosen directory and you return to the **Preferences** dialog box.

18.8.3 Importing a Paper Printing Preference

You can import a file that contains one or more print configurations.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.

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3. Click **Paper Printing** The right side of the **Preferences** dialog box displays a list of the current paper printing preferences.
4. Click **Import**. The **Open** dialog box displays.
5. Select the .xml file for the preference you want to import and click **Open**. You return to the **Preferences** dialog box. The imported file is displayed in the list. If the imported setting has the same name as an existing one, "Import_" is prepended to the name.
6. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.9 Setting iExport Preferences

The iExport tool enables you to export exams in DICOM format to another DICOM device, such as a DICOM printer or 3D imaging system. See 'iExport for DICOM Export' (see page 303).

System Administrators can add or edit DICOM forwarding addresses that are visible in the **iExport** dialog box, accessed from the menu in the worklists, from the exams, or by clicking **Q** in the IntelliSpace PACS Control Strip.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **iExport**. The right side of the **Preferences** dialog box displays a list of the current remote host descriptions.
4. Click **Add**. The **Add iExport Remote SCP Configuration** dialog box displays.
5. In the **Remote Destination AETitle** field, enter the DICOM remote host to which you want to forward.

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6. From the **Location Affinity** list, select the desired location where the iExport Service has been configured. These locations can be main and/or remote locations and each location can have multiple hosts where the iExport service is configured to run. The default **Location Affinity** is **Main Location**.
7. In the **Remote Host Description** field, enter a brief description of the remote DICOM device.
8. Enter the address of the **Host IP**.
9. In the **Port** field, enter the port number on which you want the request to take place.
10. In the **Max Concurrent Requests** field, enter the number of simultaneous associations that you want the receiving device to entertain.
11. Select the **Send Entire Study on Retry** check box if you want all exams in the study to be resent when an export has failed and is being retried.
12. Select the **Association Across Studies** check box if you want an association between the IntelliSpace PACS server and the receiving device to be kept open when multiple studies are being sent (instead of opening and closing a separate association for each study).
13. If the BSN (Burger Service Number) feature is enabled on the IntelliSpace PACS server, the **Export BSN** check box is available. Select this check box if you want the iExport Remote SCP Configuration to include the BSN when using the iExport feature. See 'iExport for DICOM Export' (see page 303).

NOTE ***The BSN (Burger Service Number) feature is only available for IntelliSpace PACS sites in The Netherlands.***

14. Click **OK**. You return to the **Preferences** dialog box.
15. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.9.1 Editing an iExport Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.

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3. Click **iExport**. The right side of the **Preferences** dialog box displays a list of the current remote host descriptions.
4. Select the remote host description you want to edit and click **Properties**, or double-click the remote host description. The **Edit iExport Remote SCP Configuration** dialog box displays.
5. Make the desired changes and click **OK**. You return to the **Preferences** dialog box.
6. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.9.2 Deleting an iExport Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **iExport**. The right side of the **Preferences** dialog box displays a list of the current remote host descriptions.
4. Select the remote host description you want to delete and click **Delete**.
5. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.10 Setting iQuery Preferences

System Administrators can add and edit iQuery preferences that allow users to import archived studies into the IntelliSpace PACS server for viewing with IntelliSpace PACS. See 'iQuery for DICOM Study Retrieval' (see page 314).

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **iQuery**. The right side of the **Preferences** dialog box displays a list of the iQuery preferences.

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4. Click **Add**. The **Add iQuery Remote SCP Configuration** dialog box displays.
5. Enter the **AE Title**, **Remote Host Description**, **Host IP**, and **Port**.
6. Select the **Preferred Query Model** from the list.
7. Select the **Close on Cancel** or **Merge Ark Compatibility** check boxes if desired.
8. Click **OK**. You return to the **Preferences** dialog box.
9. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.10.1 Editing an iQuery Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **iQuery**. The right side of the **Preferences** dialog box displays a list of the iQuery preferences.
4. Select the archive you want to edit and click **Properties**, or double-click the archive. The **Edit iQuery Remote SCP Configuration** dialog box displays.
5. Make the desired changes.
6. Click **OK**. You return to the **Preferences** dialog box.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.10.2 Deleting an iQuery Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **iQuery**. The right side of the **Preferences** dialog box displays a list of the iQuery preferences.

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4. Select the archive you want to delete and click **Delete**.
5. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.11 Setting Plug-In Preferences

System Administrators can add, edit, or delete plug-in preferences. Plug-ins allow you to create links in the IntelliSpace PACS Folders List and Shortcuts Bar that point to other web interfaces' websites. For example, if your institution's lab results are available from an in-house server, you can display that server's interface in IntelliSpace PACS by creating a plug-in. System Administrators can name the plug-ins, enable them in different IntelliSpace PACS programs, and set security for them, if necessary.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Plug-Ins**. The right side of the **Preferences** dialog box displays a list of the current plug-ins, and allows to add, edit, or delete plug-ins.
4. Click **Add**. The **Plug-In** dialog box displays.
5. Enter a **Name** for the plug-in.
6. Select the **Visible in folder tree** check box if you want the plug-in to be visible in the IntelliSpace PACS Folder List. If the plug-in is not displayed, non-administrative users cannot see it in the Folder List.
7. Enter the URL for the plug-in.
8. Select whether you want the plug-in enabled in IntelliSpace PACS Enterprise, IntelliSpace PACS Radiology, or both.
9. If desired, clear the **Disable API** check box. Only clear this check box if you are sure that the plug-in URL supports the IntelliSpace PACS Application Program Interface (API). Philips recommends leaving this check box selected.

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10. Select the **Requires Security Code** check box and select a code from the list if you only want users with specific security to be able to access the plug-in.
11. Click **OK**. You return to the **Preferences** dialog box.
12. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.11.1 Editing a Plug-In Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Plug-Ins**. The right side of the **Preferences** dialog box displays a list of the current plug-ins, and allows to add, edit, or delete plug-ins.
4. Select the plug-in you want to edit and click **Properties**, or double-click the plug-in. The **Plug-In** dialog box displays.
5. Change the plug-in settings as desired.
6. Click **OK**. You return to the **Preferences** dialog box.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.11.2 Deleting a Plug-In Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Plug-Ins**. The right side of the **Preferences** dialog box displays a list of the current plug-ins, and allows to add, edit, or delete plug-ins.
4. Select the plug-in you want to delete and click **Delete**.
5. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

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18.12 Setting Workflow Preferences

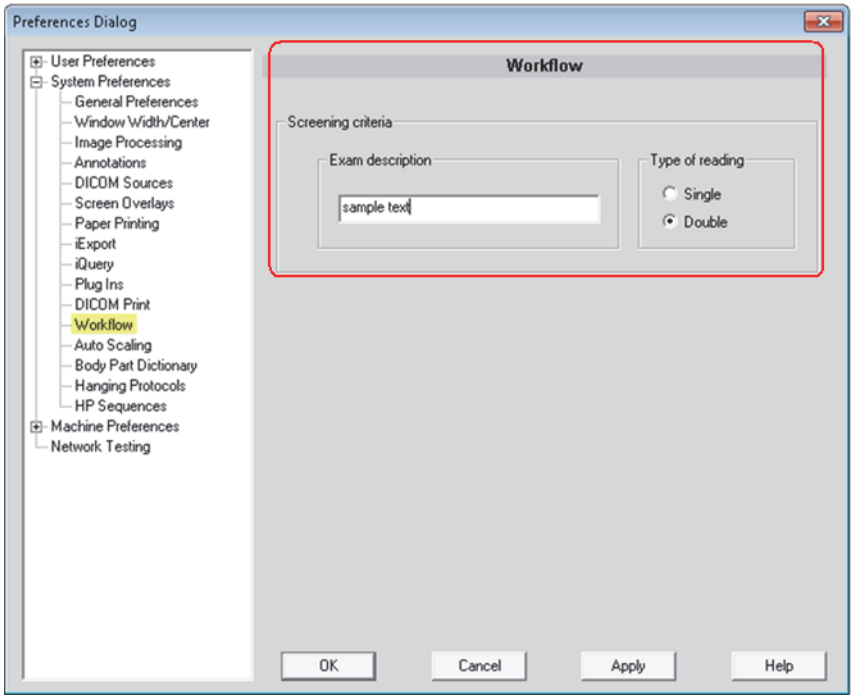
Workflow refers to the type of screening specified for reading a mammography exam. If the exam description contains a specific descriptive text (tag), IntelliSpace PACS automatically labels and associates this exam with screening. The exact tag is defined during installation, and can be modified via the Preferences dialog box in both IntelliSpace PACS Enterprise and IntelliSpace PACS Radiology.

NOTE ***This preference is only displayed if the Enhanced Mammography Features are enabled on the server.***

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.

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3. Click **Workflow**. The right side of the Preferences dialog box displays the Workflow preferences, where you can set the Screening criteria for an exam.



4. In the **Exam description** text box, enter a description of the exam you are setting the Screening criteria for.
5. Select either **Single** (single read) or **Double** (double-blind read) for the Type of reading you want.
6. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

18.13 Setting Ensure All Viewed Preference

The Ensure All Viewed preference is used to identify images (in an unread selected exam) that have not been displayed. After the preference is properly configured, an asterisk at the bottom of a thumbnail on the Canvas Page

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indicates that none of the images represented by the thumbnail have been displayed (excluded are thumbnails that represent collections, key images, captured images, or clones).

18.13.1 Adding Ensure All Viewed Setting

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Ensure All Viewed**. The right side of the Preferences dialog box displays a list of modalities and body parts.
4. Click Add.
5. In the Add Ensure All Viewed dialog box, select the Modality and optionally enter the name of the Body Part. The system logs image series that have not been displayed on the diagnostic monitors.
6. Click OK to close the Add Ensure All Viewed dialog box.
7. Click Apply to save the settings and continue to set other preferences. Click OK to save your changes and close the Preferences dialog box.

NOTE ***The body part you enter in the preference must already exist in the Body Part dictionary.***

18.13.2 Editing Ensure All Viewed Setting

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Ensure All Viewed**. The right side of the Preferences dialog box displays a list of modalities and body parts.
4. Select the item in the list that you want to edit and click Properties. The **Edit Ensure All Viewed** dialog box opens.

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5. In the Edit Ensure All Viewed dialog box, select the Modality and optionally enter the name of the Body Part. The system logs image series that have not been displayed on the diagnostic monitors.
6. Click **OK** to close the **Edit Ensure All Viewed** dialog box.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the Preferences dialog box.

NOTE ***The body part you enter in the preference must already exist in the Body Part dictionary.***

18.13.3 Deleting Ensure All Viewed Setting

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Ensure All Viewed**. The right side of the Preferences dialog box displays a list of modalities and body parts.
4. Select the item in the list that you want to delete and click **Delete**. The item is removed from the list.
5. Click **OK** to close the Preferences dialog box.

18.14 Setting Patient Columns Preferences

This **Patient Columns** preference allows the PACS administrator to select whether the following columns will be available for display in the **Patient Lookup**:

- Organization
- Sex
- SSN (see Note below)

NOTE ***If the BSN (Burger Service Number) feature is enabled on the IntelliSpace PACS server, the SSN field is replaced with the BSN field. The BSN (Burger Service Number) feature is only available for IntelliSpace PACS sites in The Netherlands.***

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1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to System Preferences. The list of available system preferences displays.
3. Click **Patient Columns**. The right side of the **Preferences** dialog box displays a list of patient columns. By default, **Sex**, **Organization**, and **SSN** are in the **Visible** list (meaning that they are displayed in the Patient Lookup).
4. Select the patient column(s) you do not want to display and click the left arrow to move those columns into the **Available** list. These columns will not be displayed in the Patient Lookup.
5. Click **Apply** to save the settings and continue setting other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

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19 Setting Machine Preferences

System Administrators can set preferences to customize the IntelliSpace PACS environment for individual needs and work habits. There are two types of preferences System Administrators can set:

- Systems preferences that affect every user. See 'Setting System Preferences' (see page 355).
- Machine preferences for settings related to the machine on which you are currently working.

System Administrators can set the following Machine preferences:

- **General Preferences**: See 'Setting General Preferences' (see page 392)
- **Display Monitors**: See 'Setting Display Monitor Preferences' (see page 393)
- **Plug-Ins**: See 'Setting Plug-In Preferences' (see page 394)
- **Local Exam Caching**: See 'Setting Local Exam Caching Preferences' (see page 396)
- **IntelliSpace PACS Chat\Mail Management:** See 'Setting IntelliSpace PACS Chat\Mail Management Preferences' (see page 397)
- **Network Testing**: See 'Setting Network Testing Preferences' (see page 399)

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. In the **Preferences** dialog box, click the **+** sign to display the list of Machine Preferences.
3. Set the desired machine preferences.
4. Click **Apply** to set a preference and continue setting machine preferences. Click **OK** when you are done.

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19.1 Setting General Preferences

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.
3. Click **General Preferences**. The right side of the **Preferences** dialog box displays the general preference options.
4. In the **Overlay Brightness** slider, adjust the brightness of image overlays displayed over diagnostic images. For the most visible overlays, set the slider to **More (100%)**.
5. In the **Ram Usage** area, select the **Restrict Cache Size** check box to restrict the RAM cache size used by IntelliSpace PACS.

   Note that for Client upgrades where **Restrict Cache Size** is checked, the default cache size will not automatically change to the new default value.
6. Enter a **Maximum Cache Size**. This text box is only enabled if **Restrict Cache Size** is checked. The valid range is 256MB to 1.2GB for a 2GB or higher system, and half the physical RAM size for systems that have less than 2GB of RAM. This is used to allow memory to be utilized by other memory intensive applications.
7. In the Override Access Group Autologout section, select the **Use Machine Auto Logout Time** check box to override the system-wide auto logout for the machine you are working on. You can then set a new auto logout value in seconds. Set the seconds settings to **0** if you do not want the machine to ever automatically log out.
8. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

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19.2 Setting Display Monitor Preferences

System Administrators can set preferences to configure the dimensions of the diagnostic monitors attached to the machine. These dimensions are used in the calibration for the Display Preferences (under User preferences) including the font size and image overlay size. See 'Setting Display Preferences' (see page 350).

For mammography, you need to optimize the display setting if high-resolution 5MP mammography monitors are connected to the client machine, in order to keep the font sizes of screen overlays and menu items readable. In addition, enable the True Size display option: display size on screen = the size on the detector. Select the following settings for mammo:

- Select **5MP image monitor** as the display monitor.
- Set **Medium Font** size to **29** (or whatever is convenient).
- Set **image menu font** to **29** (or whatever is convenient).
- Set **Pixel Pitch** to **0.165** (this depends on the monitor, so check the manufacturer's instructions).

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.
3. Click **Display Monitors**. The right side of the **Preferences** dialog box displays options for the display monitor(s). If there is more than one monitor, select the first monitor you want to configure from the **Display Monitor** list. The **Resolution** for the selected monitor displays.
4. If you plan to use the True Size zoom preset, select the **Pixel Pitch** of the Diagnostic Monitor by clicking the dropdown arrow. See 'Configuring Pixel Pitch for the Diagnostic Monitor' (see page 36).
5. Set the font sizes for **Small Font**, **Medium Font**, **Large Font**, or **Image Menu** font. These font sizes are used for overlays.

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6. Set the **Measurement Text Size**. This preference sets the font size for measurement values so that measurements values are can be adjusted for different monitor resolutions.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.
8. To configure another monitor, select it from the **Display Monitors** list.
9. Continue to configure monitors as desired.
10. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

19.3 Setting Plug-In Preferences

System Administrators can add, edit, or delete plug-in preferences. Plug-ins allow you to create links in the IntelliSpace PACS Folders List and Shortcuts Bar that point to other web interfaces' websites. For example, if your institution's lab results are available from an in-house server, you can display that server's interface in IntelliSpace PACS by creating a plug-in. System Administrators can name the plug-ins, enable them in different IntelliSpace PACS programs, and set security for them, if necessary.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.
3. Click **Plug-Ins**. The right side of the **Preferences** dialog box displays a list of the current plug-ins, and allows you to add, edit, or delete plug-ins.
4. Click **Add**. The **Plug-In** dialog box displays.
5. Enter a **Name** for the plug-in.
6. Select the **Visible in folder tree** check box if you want the plug-in to be visible in the IntelliSpace PACS Folder List. If the plug-in is not displayed, non-administrative users cannot see it in the Folder List.
7. Enter the URL for the plug-in.

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8. Select whether you want the plug-in enabled in IntelliSpace PACS Enterprise, IntelliSpace PACS Radiology, or both.
9. If desired, clear the **Disable API** check box. Only clear this check box if you are sure that the plug-in URL supports the IntelliSpace PACS Application Program Interface (API). Philips recommends leaving this check box selected.
10. Select the **Requires Security Code** check box and select a code from the list if you only want users with specific security to be able to access the plug-in.
11. Click **OK**. You return to the **Preferences** dialog box.
12. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

19.3.1 Editing a Plug-In Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.
3. Click **Plug-Ins**. The right side of the **Preferences** dialog box displays a list of the current plug-ins, and allows you to add, edit, or delete plug-ins.
4. Select the plug-in you want to edit and click **Properties**. The **Edit Plug-In** dialog box displays.
5. Change the plug-in settings as desired.
6. Click **OK**. You return to the **Preferences** dialog box.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

19.3.2 Deleting a Plug-In Preference

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.

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3. Click **Plug-Ins**. The right side of the **Preferences** dialog box displays a list of the current plug-ins, and allows you to add, edit, or delete plug-ins.
4. Select the plug-in you want to delete and click **Delete**.
5. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

19.4 Setting Local Exam Caching Preferences

System Administrators can modify the supplied settings for the local exam cache. The **Local Exam Cache** folder in the **Folder List** allows you to cache patient exams on your local machine for later review.

Images are cached in an encrypted format. If there is not sufficient memory, exams are deleted in a first-in, first-out manner. If there is still not sufficient memory, a message displays.

Users who want to change the Local Exam Caching Machine preferences must have write access to the computer's registry settings. If domain users at your facility do not have this type of privilege, there is a workaround that keeps the security tight, but allows IntelliSpace PACS the ability to use this application section of the registry for our use. This is easily changed by adding a policy for domain users to allow full access to the HKEY_LOCAL_MACHINE\Software\Stentor registry section only plus its inherited keys for authenticated users. You only need to add full access to the HKEY_LOCAL_MACHINE\Software\Stentor\..., not to the full registry.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.
3. Click **Local Exam Caching**. The right side of the **Preferences** dialog box displays current local exam caching preferences. The **Local Path** field shows where the exams are being stored. You cannot edit this path.
4. Set the **Maximum Cache Size** in megabytes. This size may be restricted to prevent over-utilization of memory resources.

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5. Set the following options:
   - Select the **Delete exams upon logout** check box to automatically delete cached exams when you log off of IntelliSpace PACS.
   - Select the **Automatically delete exams not accessed for more than:** check box to permit the system to automatically delete exams in your cache after the amount of time you specify.
6. Click **Restore Defaults** to return the local exam caching settings to their default values.
7. Click **Apply** to save the settings and continue to set other preferences. Click **OK** to save your changes and close the **Preferences** dialog box.

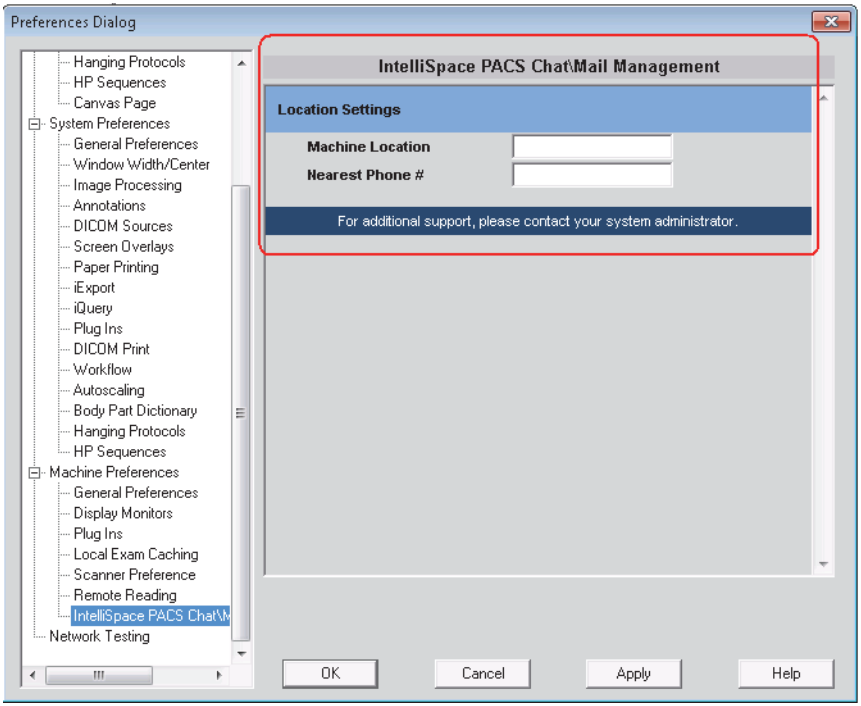
19.5 Setting IntelliSpace PACS Chat\Mail Management Preferences

The Chat\Mail Management preferences are used to identify the machine location and the number of the closest telephone (to that machine) when a Workflow Layer user is chatting or emailing using the IntelliSpace PACS Chat\Mail feature. This information is seen next to the user's name in the contact list of users, when you click the arrow to the left of the contact's name. See the *IntelliSpace PACS Workflow Layer 2.0 User Guide* for more information on viewing this contact data.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click the **+** sign next to Machine Preferences. The list of available machine preferences displays.

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3. Click **IntelliSpace PACS Chat\Mail Management**. The right side of the Preferences dialog box displays the Chat\Mail Management preferences you can set.



4. Under Location Settings, enter the **Machine Location** and the **Nearest Phone #**.

5. Click **Apply** to save the settings and continue setting other preferences. Click **OK** when you are done.

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19.6 Setting Network Testing Preferences

NOTE ***Network Testing is not a Machine Preference. It is, however, present and configurable in the Preferences dialog below Machine Preferences.***

System Administrators with the proper privileges can configure numerous aspects of network testing and view the results of those tests on a server-by-server basis. In most cases, the network testing options will be used by an IntelliSpace PACS user in conjunction with a Philips Customer Care representative to troubleshoot network speeds. However, if you find that images are displaying slowly or that IntelliSpace PACS is not responding quickly, you can test the network on your own.

1. Click the **P** icon in the upper right corner of the IntelliSpace PACS Control Strip.
2. Click **Network Testing**. The right side of the **Preferences** dialog box displays the current network settings.
3. Set the **Bandwidth Threshold** to the maximum speed of your network. You can also set the size of the test pack in this field.
4. Set the **Latency Threshold** to the maximum allowable response time for the server. If you are going to run a continuous test, set the **Delay Between Tests** between 0 and 3600 seconds. You can set the **Bandwidth Test Size** between 1 and 20000 KB.
   - The **Run Continuously** check box is only for Philips use and is password-protected.
5. Select the **Log Result to file** check box if desired. The log is stored in %PUBLIC%\Philips\<majorVersion.minorVersion>\iSiteLogs\ (Windows 7) or %ALLUSERSPROFILE%\Application Data\Philips\<majorVersion.minorVersion>\iSiteLogs (Windows XP).
6. Select the **Log Results to server** check box if desired.
7. Select the individual server(s) you want to test, or click **Select All**.

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8. When you have set all options, click **Start**. This runs the test you have configured and displays the results below. Results displayed in red indicate that the server should be investigated by a System Administrator or Philips Customer Care representative.
9. Click **OK** to save your changes and close the **Preferences** dialog box.

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20 Mouse and Keyboard Reference Sheet

20.1 Mouse Control Reference Sheet

IntelliSpace PACS includes User preferences for the following mouse options:

- **Mouse Scheme Options**: You can choose whether you want to use the standard mouse actions and cursor (**Standard**) or use cursors whose shape indicates their action (**Enhanced**). **Standard** is enabled by default. See 'Standard Mouse Scheme' (see page 401), 'Enhanced Mouse Scheme' (see page 403), and 'Setting Mouse Preferences' (see page 340).
- **Scrolling**: You can choose one of two options: **Coarse Fast Cine** scrolling or **Custom Scrolling**. See 'Scrolling' (see page 405) and 'Setting Mouse Preferences' (see page 340). Scrolling will either be **Fast Cine** or **Custom Scrolling**, depending on which method you choose. **Custom Scrolling** works the same in the **Standard** and **Enhanced** modes as **Coarse Fast Cine**.

20.1.1 Standard Mouse Scheme

If you select **Standard** mouse scheme options in the Mouse User preferences, the following actions are available. See 'Setting Mouse Preferences' (see page 340).

Action	Left Button	Wheel	Right Button
Click	Selects and deselects images and/or series. Also releases any other mouse modes currently in effect.	Not used	Displays menu

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Action	Left Button	Wheel	Right Button
Double-click	Opens image popup window. In a list of patients or exams, opens the most recent exam available for that patient. (Only available when using IntelliSpace PACS on an internal network.) On a popup window title bar, toggles between displaying the entire window and just the title bar. On a pane in the diagnostic monitor, toggles full screen image mode for that image.	Enables **Fast Cine** mode in the Canvas Page with an initial frame rate that is based on the User Display Preference for the Default Cine Rate. See 'Setting Display Preferences' (see page 350). Double-clicking again turns **Fast Cine** mode off. You can also use the middle wheel click and drag for **Fast Cine**.	Not used
Click middle button + drag up and down		Enables **Coarse Fast Cine** mode. This mode may skip images, depending on how far the mouse is from where the **Fast Cine** originally began.	
Click + drag	**On the image**: Changes window level vertically. Changes window width horizontally. **On the image window**: Moves images or series within the exam rack.	**X-Rays**: Pan in zoomed view **Stack Series**: Enables Fast Cine.	Not used
Alt+drag	Zoom	Pan in zoomed view	Not used
Ctrl+drag	Pan in zoomed view	Pan in zoomed view	Not used
Roll wheel forward or backward	Not used	**X-Rays**: Zoom into or out of the image at the cursor's location. **Series**: Frame-by-frame review through slices. **In Cine Mode**: Exits Cine mode	Not used

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Action	Left Button	Wheel	Right Button
Hold Shift while cineing a linked stack	Temporarily disengages a stack link.	Temporarily disengages a stack link.	Temporarily disengages a stack link.
Move up or down		In **Fast Cine** mode, changes the frame rate. Move the cursor up to cine backward and down to cine forward. The farther you move the cursor from the anchor point (that is, the click point or direction change point), the faster the frame rate.	
Hold middle mouse button and move mouse vertically or horizontally		When **Custom Scrolling** is selected with the Standard Mouse Scheme option, images scroll until either the button is released, the mouse is halted, or the end of the stack has been reached.	

20.1.2 Enhanced Mouse Scheme

If you select **Enhanced** mouse scheme option in the Mouse User preferences, the cursors shapes indicate their action. See 'Setting Mouse Preferences' (see page 340).

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Cursor	Description
	Window Width/Level
	Pan
	Zoom
	Scroll
	Acceleration Gain

You can cycle through the cursor modes by double-clicking the middle mouse button or choosing a mode from the **Interaction** menu in thumbnail or image popup windows.

When IntelliSpace PACS starts, the mouse cursor is set to a regular arrow. After you change the cursor mode in the General User preferences, it is persistent.

If the current mouse cursor is set to scroll, and the mouse hovers over a non stack image, the mouse cursor changes to Window Width/Level mode. When the cursor is moved over a stack image again, it changes back to scroll mode.

Note the following about enhanced cursors in stack images:

- You double-click the left mouse button to select images and use click-drag to perform the mouse mode functions.

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- When **Custom Scrolling** is enabled with the Enhanced Mouse Scheme option, holding the left mouse button down while scrolling moves through the stack images until the button is released, the mouse is halted, or the end of the stack has been reached.

20.1.3 Scrolling

Coarse Fast Cine scrolling is the default method, but **Custom Scrolling** is available as a Mouse preference. See 'Setting Mouse Preferences' (see page 340). You engage **Coarse Fast Cine** mode by left-clicking while dragging the mouse down past the point in which you placed your cursor to cine through the images.



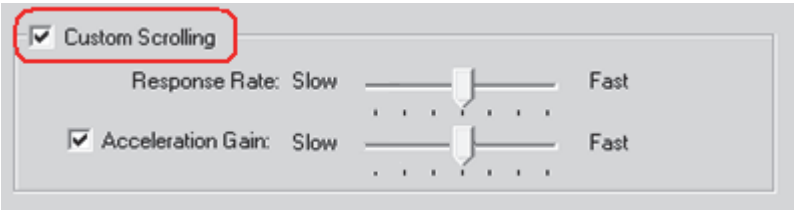
WARNING ***Coarse Fast Cine may skip images, depending on how far the mouse is from where the Fast Cine originally began.***

When **Custom Scrolling** is enabled, **Coarse Fast Cine** is disabled.

The key difference between **Coarse Fast Cine** and **Custom Scrolling** is the following:

- In **Coarse Fast Cine**, scrolling automatically queues up a number of images and then displays the entire queue based on the initial mouse movement distance.
- In **Custom Scrolling**, users have precise control of the image set by starting image traversing when the mouse is moved, and immediately halting the traversing when the mouse is stopped or the button is released. Many users prefer this method of controlling image stack navigation. The number of images that scroll when the mouse is moved can be decreased or increased using slider bars. **Custom Scrolling** supports **Standard** and **Enhanced** mouse configurations, and is disabled by default.

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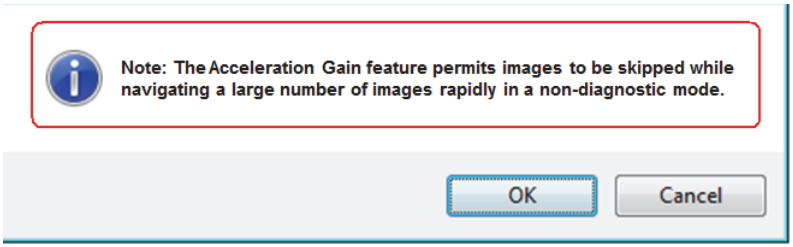


The **Response Rate** (speed) and **Acceleration Gain** options can be used separately or combined, as follows:

- **Response Rate** allows you to use a slider to set how fast you want to want to move through a stack of images. If the **Response Rate** slider is set without an **Acceleration Gain** enabled, no images are skipped, regardless of the speed at which the mouse moves. The slower the mouse moves, the more accurate correlation there is between the number of viewed images and the distance the mouse is moved, due to processor and cache limitations.
- **Acceleration Gain** allows you to use a slider to set the acceleration sensitivity.

WARNING

When the Acceleration Gain option is selected, the cursor changes shape when a set of images is passed over and not shown to indicate that some image skipping is occurring. This is analogous to a flipping through the pages of a book to quickly get to the area of the book you want to begin to read. When you select this option, you must acknowledge the following message, which informs you that images may be skipped when navigating a large number of images. You control when skipping occurs by the rapidity with which you move the mouse. The cursor changes shape to indicate that images are being skipped during a non-diagnostic transversal of images.


Note: The Acceleration Gain feature permits images to be skipped while navigating a large number of images rapidly in a non-diagnostic mode.
OK
Cancel

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Note the following about Custom Scrolling sliders:

- The distance of mouse movement directly correlates to the number of images that increment in the stack, after the entire image stack has been read into the IntelliSpace PACS memory.
- When the slider is set in the middle position and **Acceleration Gain** is selected, the stack scrolls with a standard movement across the height of the display at least 900 images (assuming a 2560 x 2048 monitor in a Landscape position).
- By default, the sliders are set to the middle position; **Slow** can go slower and **Fast** can go faster than the default Mouse Properties settings in Windows.

NOTE ***The calculations used by the sliders are based on default Mouse Properties settings for Windows on that machine. If the user changes these default settings, the relative values of Slow and Fast on the sliders are impacted. We recommend that users retain the default value for Mouse Properties in Windows when using this feature.***

When either **Response Rate** or **Acceleration Gain** is selected, when the mouse reaches the top or bottom row of the display, the scrolling continues in the same direction as it was previously defined, using the speed specified in the slider. This means that you do not have to pick the mouse up to begin scrolling again after the mouse has reached the top or bottom of the screen.

20.2 Keyboard Commands

This table describes the keyboard commands when using IntelliSpace PACS with a two-button mouse. These commands replace the wheel function of the three-button mouse, but can also be used by three-button mouse users.

You can program other input devices, such as the ShuttlePro, to use the IntelliSpace PACS keyboard shortcuts. See the applicable device user manual for general configuration instructions.

NOTE ***You can set a User preference to change and create keyboard shortcuts. See 'Setting Keyboard Shortcut Preferences' (see page 346). The table below indicates which keyboard shortcuts are hardcoded and cannot be changed.***

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The following keyboard shortcuts cannot be configured:

Description	Action
Numbers 1-9	Allows you to cycle through the various preset window width/level settings for a CT image or series.
Delete	Removes the currently selected measurement or annotation from the image. The user must first select that annotation and then click Delete.
Home and End	Jumps to the first and last images in the selected image series, respectively.
Mouse-over	Brings a popup window to the foreground.
Period (.) and Comma (,)	Increases or decreases the angle for the **Edge Enhancement** and **Edge Detection** Image Processing tools. For **CLAHE** Image Processing, alternately increases or decreases the clip parameter.

The following keyboard shortcuts can be configured:

Description	Default Keystroke	Hardcoded	Action
Angle Measurement	[NONE]		Activates the angle measurement for a single use.
Angle Measurement Persistent	[NONE]		Keeps the angle measurement tool active for multiple uses.
Arrow Annotation	A		Activates arrow annotation for a single use.
Arrow Annotation Persistent	[NONE]		Keeps the arrow annotation tool active for multiple uses.
Circle	[NONE]		Activates the Circle Annotation for a single use.

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Description	Default Keystroke	Hardcoded	Action
CLAHE	Shift + C		Applies the CLAHE filter to the image (when Mammography features are enabled)
Collection Navigation Next Prior Exam	[NONE]		Navigate forward to the next prior exam.
Collection Navigation Previous Prior Exam	[NONE]		Navigate backward to the previous prior exam.
Collection Navigation Rectangle Backward	[NONE]		Navigate to the previous collection window in the main and prior exam.
Collection Navigation Rectangle Forward	[NONE]		Navigate to the next collection window in the main exam and prior exam.
Flip Horizontal	Ctrl+H		Flips an image horizontally.
Flip Vertical	Ctrl+T		Flips an image vertically.
Go to Beginning of Stack; Go to End of Stack	Home and End		Jumps to the first and last images in the selected image series, respectively.
Help Manual	F1		Open IntelliSpace PACS online help
Horizontal Rack	Ctrl+Alt+H		Horizontal rack
Invert Grayscale	I		Inverts grayscale
Link/Unlink Images	[NONE]		Toggles between linking and unlinking images in an exam.
Localizer Mode	F12	Yes	Toggles the **Localizer Tool** on and off.

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Description	Default Keystroke	Hardcoded	Action
Magnifying Glass	Y		Toggles Magnifying Glass on and off
Mark as Negative	Ctrl + Shift + N		Marks a displayed exam with a Negative rating
Mark as Positive	Ctrl + Shift + P		Marks a displayed exam with a Positive rating.
Mark as Read	F3		Marks the current exam as read if it is not marked read already.
Mark as Undecided	Ctrl + Shift + U		Marks a displayed exam with an Undecided rating.
Measurement Palette	M		Toggles the Measurement Palette on and off.
Mirror Link	[NONE]		Toggles mirror links on and off in an exam.
Next Exam on Worklist Filter	Ctrl + F10		Displays the next unread, unlocked exam (when Mammography features are enabled)
Next Hanging	W		Next hanging protocol
Next Hanging Sequence	Shift + W		Next sequence of hanging protocol
Next Image	[NONE]		Displays the images going forward in order.
Next Prior	Shift+F10		Displays the next opened prior exam (if the main exam has more than one prior exam) onto the diagnostic monitor(s) for comparison while keeping the main exam loaded on the diagnostic monitors,

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Description	Default Keystroke	Hardcoded	Action
Next Series from the Exam	F8		When viewing a popup image in a horizontal rack, this key hangs the next series from the exam. When viewing a popup image in a vertical rack, this keys hangs the next exam, not the next series within the exam
Page Navigation Rectangle Backward	F9		Simultaneously loads the previous current and prior series (if available) in the exam rack onto the diagnostic monitors.
Page Navigation Rectangle Forward	F10		Simultaneously loads the next current and prior series (if available) in the rack onto the diagnostic monitors.
Previous Exam on Worklist Filter	Ctrl + F9		Displays the previous patient on the worklist.
Previous Hanging	Q		Previous hanging protocol
Previous Hanging Sequence	Shift + Q		Previous sequence of hanging protocol
Previous Image	[NONE]		Displays the images going backward in order.
Previous Prior	Shift+F9		Displays the previously opened prior exam (if the main exam has more than one prior exam) onto the diagnostic monitor(s) for comparison while keeping the main exam loaded on the diagnostic monitors.
Previous Series from the Exam	F7		When viewing a popup image in a horizontal rack, this key hangs the previous series from the exam. When viewing a popup image in a vertical rack, this key hangs the previous exam, not the previous series within the exam.

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Description	Default Keystroke	Hardcoded	Action
Reset Image Display	Ctrl + R		Resets the image back to its original WW/WL. Measurements and annotations can also be reverted. This shortcut does not apply to rotating or flipping images (when Mammography features are enabled)
ROI Circle Measurement	[NONE]		Activates the ROI circle measurement for a single use.
ROI Circle Measurement Persistent	[NONE]		Keeps the ROI circle measurement tool active for multiple uses.
ROI Ellipse Measurement	[NONE]		Activates the ROI ellipse measurement for a single use.
ROI Ellipse Measurement Persistent	[NONE]		Keeps the ROI ellipse measurement tool active for multiple uses.
ROI Freehand Measurement	[NONE]		Activates the ROI freehand measurement for a single use.
ROI Freehand Measurement Persistent	[NONE]		Keeps the ROI freehand measurement tool active for multiple uses.
Rotate 90 CW	[NONE]		Rotates the image 90 degrees clockwise.
Ruler Measurement	[NONE]		Activates the ruler measurement for a single use.
Ruler Measurement Persistent	[NONE]		Keeps the ruler tool active for multiple uses.

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Description	Default Keystroke	Hardcoded	Action
Scout Line Mode	F11	Yes	Toggles **Scout Mode** on and off.
Show/Hide All Overlays	Ctrl+F6		Toggles image overlays, DICOM overlays, and any measurements and annotations.
Show/Hide Bit Overlays	Ctrl+Alt+F6		Toggles bit overlays on and off
Show/Hide Image Overlays	F6		Toggles screen overlays. It does not toggle image overlays shutters and DICOM 6000.
Show/Hide Shutter Displays	Ctrl+Shift+F6		Toggles shutter overlays on and off
Single Image Window Level	L + left mouse button drag	Yes	Adjusts the Window Width/Level of a single image instead of the entire series (when Mammography features are enabled)
Spine Labeling Annotation	[NONE]		Opens the Spine Labelling panel.
Step-Zoom Step	S		Activates the Step-Zoom tool in an image. You can change this to another keyboard shortcut in the User preferences.
Text Annotation	[NONE]		Enables the text annotation for a single use.
Text Annotation Persistent	[NONE]		Keeps the text annotation tool active for multiple uses.
Toggle All Links	Shift + L		Toggles links on and off. When the links are off, the link symbols disappear from the windows description and the word "Link" does not appear in the overlay portion.
Toggle Cine Mode	C		Toggles cine mode

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Description	Default Keystroke	Hardcoded	Action
Toggle Hanging Protocol Monitor Icons	F2		On a one-monitor system, toggles between displaying the first and second series of the main exam. On a two-monitor system, toggles between what is displayed on Monitor 1 and Monitor 2.
Toggle Key Image	Space	Yes	Toggles key images.
Toggle Pixel-to-Pixel Zoom	P		Toggles pixel-to-pixel zoom
Toggle SR CAD Results	Shift + S		Toggle SR CAD results. The label "CAD Markers On" is displayed at the bottom of the image when the keyboard shortcut to display CAD markers has been used. The label "CAD Markers Off" is displayed at the bottom of the image when the keyboard shortcut has been used to turn the marker off. "CAD Markers Off" is also displayed when an image is first displayed.
Toggle True Size Zoom	T		Turns the True Size zoom on and off (when Mammography features are enabled)
Vertical Rack	Ctrl+Alt+V		Vertical rack
Worklist/Canvas Page Refresh	F4	Yes	Refresh Worklist/Canvas Page

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21 IntelliSpace PACS Quick Reference Table

This table describes IntelliSpace PACS features, from basic image-selection and viewing features to the more complex image-manipulation features.

You can set preferences for keyboard shortcut to map keys and key combinations to actions in IntelliSpace PACS. See 'Setting Keyboard Shortcut Preferences' (see page 346). You can also specify enhanced cursors by setting a User General preference. See 'Setting General Preferences' (see page 338).

Task	Action
Quickly load or unload an exam	Right-click the exam listing in the Patient History and select **Open**/**Close** exam.
Expand an image or image-series	Double-click the left mouse button on the desired image or image-series.
Adjust brightness and contrast (Window Width/ Window Level)	Left-click the image and drag the left mouse button horizontally or vertically, respectively. **Default WW/WL**, **Histogram Calculation** and **Modality Default** values are available for all modalities in the menu. CT exams also display preset Window Width/Level values in the menu. These values include the **Default WW/WL**, **Abdomen**, **Brain**, **Bone**, **Liver**, **Lung**, **Mediastinum**, and any custom Window Width/Levels created by the IntelliSpace PACS System Administrator on a site-by-site basis.
Compare (link) images in an exam	Right-click on an image and select the **New Link** from the menu. Right-click on the image you would like to link and then select **Join Link**. You can also quickly link all images with the same point of reference by choosing **Link All**.
Compare two or more exams	1. Open the exams you wish to compare. 2. Double-click on the desired images to get expanded view. 3. Resize or relocate images so they are side by side. **X-Ray Images**: Manually link **Series**: Auto linked when images margins are edge to edge.

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Task	Action
Resize image windows or exam-rows	Place your cursor on the window's borders or on the exam-row's bottom margin, left-click and drag.
Select and deselect images or image-series	Left-click on the desired image or image-series.
Release any current mouse mode	Left-click.
Access image menu	Right click on the desired image or image-series.
Show/hide image overlays	Press F6 to toggle lays on and off for all exams in the active patient. Press Ctrl + Alt + F6 to toggle only DICOM 6000 overlays on/off. Press, Ctrl + F6 to toggle all overlays on/off (IntelliSpace PACS lays, IntelliSpace PACS Annotations & Measurements, and Embedded and Declared DICOM Overlays).
Pan	**X-Ray images**: With a wheel-mouse, click and drag the wheel-button. With a two button mouse, left-click and drag the mouse while holding down the Ctrl key. **Series**: Left-click and drag the mouse while holding down the Ctrl key.
Zoom	**X-Ray images**: With a wheel-mouse, roll the mouse wheel back and forth. With a two-button mouse, click the left mouse-button and drag the mouse while holding down the Alt key. **Series**: Click the left mouse-button and drag the mouse up/down while holding the Alt key.
Review series frame-by-frame	With a wheel-mouse, roll the mouse wheel back and forth. With a two-button mouse, press the up and down arrows keys.
Fast Cine review for series	Double-click a multi-image stack series. The initial frame rate is based on the User Display Preference for the Default Cine Rate. See 'Setting Display Preferences' (see page 350). Alternatively, you can hold down the mouse wheel and drag the mouse up or down.
Access diagnostic reports for an exam or patient	Click the small Report icon at the upper left corner of the exam margin. This button is white if reports are unavailable or are not supported by your institution. You can also right-click the exam listing in the Patient History and select **Show Reports** from the menu.
Access exam notes	Right-click on exam listing or the timeline and select **View Exam Notes**.
Invert brightness and contrast	Right-click on an image and select **Image Processing** from the menu, then choose **Invert Image**.

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Task	Action
Flip an image around the x or y axis	Right-click on an image, select **Flip/Rotate/Sort** from the menu, then choose **Flip Vertical** or **Flip Horizontal**.
Rotate an image clockwise or counter-clockwise	Right-click on an image, select **Flip/Rotate/Sort** from the menu, then choose **Rotate 90 CW** or **Rotate 90 CCW**.
Sort an image series	Right-click on an image, select **Flip/Rotate/Sort** from the menu, then choose **Table Position Ascending**, **Table Position Descending**, **Image Number Ascending**, or **Image Number Descending**.
Annotate an image with text or symbols	Right-click on an image and select **Annotations** from the menu.
Measure lengths, angles or regions of interest	Right-click on an image and select **Measurements** from the menu.
Delete measurements	Right-click the measurement handle and select **Delete All Measurements and Annotations** from the menu.
Edit measurements format	Right-click the measurement handle and select **Edit Font** or **Edit Line Style** from the menu.
Temporarily disconnect a linked image	Hold down the Shift key while performing image manipulation with the mouse or the keyboard.
Unlink images in an exam	Right-click on the image you wish to unlink and select **Leave Link** from the menu.
Auto-link expanded images	Expanded CT or MR images auto-link when their margins are placed side by side. Left-click on the image's top margin or bottom annotation area and drag images margins edge to edge.
Create a scout view	Right-click on an image and select **Scout Line Mode** from the menu.
View a series with multi-image mode	To view a series with several slices displayed simultaneously in one window, right-click the series and select the desired configuration from the **Multi-image mode** menu.
Open a clone-image in an image popup window	Right-click an image and select **Clone Window** from the menu, then double-click the cloned image.

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Task	Action
Copy to the Windows clipboard	Right-click on an image and select **Save** and **Window/Image To Clipboard** from the menu.
Apply spine labeling to an image of the spine	Right-click on any image or series which includes the vertebrae and select **Spine Labeling** from the **Annotations** menu. Click the image where you would like labels inserted in conformance with the **Spine Labeling** dialog box.
Increase or decrease the angle for the Edge Enhancement, CLAHE and Edge Detection Image Processing tools	Hover the mouse over the image that has one of these Image Processing tools applied and click the "," (comma) key to decrease the degree parameter and the "." (period) to increase the parameter.
Mark an image as a "key image"	Press the space bar.
View exam information	Right-click on the left margin of the exam-row, and select **Exam Information** from the menu. If you are in **Vertical** mode, right-click the top margin to access the menu.
View the available presentation state for an exam	Right-click on the left margin of the exam-row, then select **Presentation State** from the menu. If you are in **Vertical** mode, right-click the top margin to access the menu.
Minimize all images in an exam row	Right-click on the left margin of the exam-row, then select **Minimize Images** from the menu. If you are in **Vertical** mode, right-click the top margin to access the menu.
Close an exam	Right-click on the left margin of the exam-row, then select **Close Exam** from the menu. If you are in **Vertical** mode, right-click the top margin to access the menu.
Hide or display the Patient History	Click the (P) **Preferences** icon in the Control Strip and select or clear the **Display** check box in the General preferences section.
Change between horizontal and vertical rack modes	Right-click on the left margin of the exam-row, then select **Horizontal Rack** or **Vertical Rack** from the menu. If you are in **Vertical** mode, right-click the top margin to access the menu.

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Task	Action
Resize an exam row	1. Place your cursor on the margin of the exam-row. The cursor changes to a resize cursor. 2. Click and drag the margin to the desired height (or width if you are working in **Vertical** mode).
Reorder images in an exam row	Place your cursor on the image's gray top margin or bottom annotation area, left-click and drag to a new location.
Print	Right-click on an image and select **Print** from the menu, then choose **Paper Printer** .
Save image to file or to clipboard	Right-click on the image you wish to save and select **Save** from the menu. Then select **Window/Image** to **Clipboard**/**File**.
Export an exam to DICOM	Right-click an exam listing either in the Patient History or in a worklist and select **Export via DICOM** from the menu.
Logout	Click the **X** button in the upper right corner of the Control Strip.

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22 Glossary

Accession Number (ACC #)

The unique identifier for exams; the maximum length of an accession number is 20 characters

CAD Marker

Computer-aided detection marker

Canvas Page

The window in which patient exams are displayed. Exams are displayed in Exam Racks that run horizontally or vertically across the Canvas Page. See 'Introduction to the Canvas Page' (see page 195).

CC

View position: cranial-caudal

CD Manager

See Media Viewer

CLAHE

Contrast Limited Adaptive Histogram Equalization. A digital image process that visually enhances details on the image.

Control Strip

The top portion of the IntelliSpace PACS screen that displays the user name, currently active tools, and icons for the **Preferences** dialog box, online help, and logging off. See 'Control Strip' (see page 49).

Diagnosis

The determination of the nature of a disease. Or, a dedicated viewing workflow for this purpose.

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DICOM

Digital Imaging and Communication in Medicine; sometimes referred to as DICOM standard, or NEMA PS3. Provides a detailed specification that describes formatting and exchanging images and associated information.

Dictionary

A collection of related items stored in the database that have unique codes (for example, Body Part, Modality Type, and so on). Dictionaries are configured and maintained in the IntelliSpace PACS AdminTool.

Discussion Filter

A filter that selects all exams where there has been a difference of opinion between the first and second readers. This filter creates a to-do list for the third reader in a double-blind read workflow.

Double-Blind Read

Workflow where two readers (radiologists) evaluate and rate the same clinical images. The two readers work independently, and do not have access to each other's evaluations. This method is used to prevent individual bias during rating.

Duplicate Unique Identifier (DUP UID)

The situation that occurs when the same study identifier (UID) is given to multiple studies of different patients. IntelliSpace PACS includes tools that let you resolve problems related to duplicate UIDs. See 'Resolving Duplicate UIDs' (see page 323).

Edge Enhancement

Image setting that improves the perceived sharpness of the image details.

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Exam

An order received from the HIS/RIS that resides in the IntelliSpace PACS database. Exams do no necessarily have images. In IntelliSpace PACS, the unique identifier for exams is Accession #.

Exam Lookup

A search tool that allows you to find exams based on a combination of search criteria. See 'Exam Lookup Overview' (see page 103).

Exam Rack

Patient exams (images or image-series) are displayed in Exam Racks. The order of the Exam Rack is chronological and corresponds to the Patient History.

Exception Handler

The feature you use to resolve exams whose DICOM information conflict with information from the RIS. See 'Using the Exceptions Handler' (see page 180).

Filter

Tool for dynamic search and selection, based on user-defined criteria, and resulting in a dynamic worklist.

Filter Criteria

The information you specify for a filter, such as Organization and Modality.

Folder

Container for storing patient exams of specific relevance or interest, resulting in a static worklist (for example, teaching files).

Folder List

Provides access to a variety of IntelliSpace PACS tools, filters, and folders. See 'Folder List' (see page 51).

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History Folder

The folder in the Folder List that contains the last 100 exams you have viewed. See 'Folder List' (see page 51).

iExport

The feature used to export exams via DICOM to another system or workstation, such as a 3D workstation. See 'iExport for DICOM Export' (see page 303).

iExport Queue

A real-time display of the status of exams that have been exported using the iExport feature. You can also delete and restart exported exams from the iExport Queue. See 'Viewing the iExport Queue' (see page 310).

Image quality icon

An icon in the lower-right corner of the image that indicates the relative quality of the image. See 'Image Quality Indicator' (see page 45).

iQuery

The feature used to retrieve studies through DICOM Query Retrieve from another system. See 'iQuery for DICOM Study Retrieval' (see page 314).

iQuery Queue

The feature that enables you to monitor the progress of an exam being retrieved, remove requested studies from the queue, and perform other administrative functions. See 'Viewing the iQuery Queue' (see page 320).

IntelliSpace PACS Administration Tool

The application used by IntelliSpace PACS System Administrators and Technical Support to view and modify site configuration settings, such as security and dictionaries.

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IntelliSpace PACS Enterprise

An enterprise-wide, Web-based image distribution solution that delivers the power of radiology to the point of patient care.

IntelliSpace PACS Radiology

IntelliSpace PACS diagnostic viewer, designed for Radiologists.

Keypad

A small hardware device, placed next to the keyboard, that offers a quick method for launching frequently used functions.

LCC

View position and breast examined: left cranial-caudal

LMLO

View position and breast examined: left medial-lateral oblique

Local Exam

The tool that enables you to download patient exams to your local machine. This speeds up access to image data when running IntelliSpace PACS remotely.

Localizer Tool

The tool that helps you visualize and navigate to a location in multiple series with different orientations. See 'Using the Localizer Tool' (see page 245).

Machine Auto Logout Time

The amount of time after which a machine automatically logs you off from IntelliSpace PACS. The System Administrator can set a machine preference to override the system-wide auto logout time. See 'Setting General Preferences' (see page 392).

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Machine Filter

A filter that is associated with a specified machine (workstation). Users can only use a machine filter associated with the machine they are working on. See 'Filtering Worklists' (see page 149).

Machine Preference

Various settings that control the behavior of IntelliSpace PACS on a specific machine. See 'Setting Machine Preferences' (see page 391).

Media Viewer

The feature that allows you to create personalized CDs and DVDs that include an encapsulated version of IntelliSpace PACS and the patient exams you choose. See 'Using the Media Viewer' (see page 297).

Merge/Link Candidate List

A list of patients that are identified by the IntelliSpace PACS system as candidate pairs for patient linking and merging. See 'Merging Patient Records from the Same Organization' (see page 91).

MLO

View position: medial-lateral oblique

Modality

Type of acquisition device used to generate the images of an examination. Examples are CR, MG, RF, US, MR, XA

Multi-Image Mode

The feature that allows you to display multiple images in one window in various configurations.

My Filters

A folder in the Folder List that contains your personal filters. See 'Folder List' (see page 51).

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My History

A folder in the Folder List that contains the last 100 exams that you have viewed. See 'Folder List' (see page 51).

Not Read By Me Filter

A filter that selects all exams that have not yet been read by the current user. This filter creates a personal to-do list.

PACS

Picture Archiving and Communication System

Patient

A person receiving health care services. In IntelliSpace PACS, the unique identifier for patients is a Medical Record Number (MRN), also known as a Patient ID.

Patient Folder

A container of studies, examinations, series, images, reports, requests, texts, and notes of a patient.

Patient History

A chronological list of all exams available for the selected patient. The exams currently selected for display are highlighted with a gray background. See 'Using the Patient History Timeline' (see page 197).

Patient Lookup

A search tool that allows you to find patients based on a combination of search criteria.

Patient Lookup Screen

A screen that displays worklists, as well as tools for creating dynamic and static worklists (that is, filters and folders).

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Permissions

The functions the user is permitted to perform on the system. Permissions are linked to the role that the user is given by the system administrator.

Personal Folders

A folder in the Folder List that contains exam links you want to save for future reference. See 'Folder List' (see page 51).

Pixel-to-Pixel Zoom

Zoom setting where a single pixel in the image corresponds to a single pixel on the screen.

Presentation State

The presentation state of images or series refers to the attributes which determine how the images or series are displayed, e.g., zoom, window width/level settings, whether or not annotations and measurements are shown.

Prior

Clinical images from previous exams of a patient that can be relevant for diagnosing or rating the current medical condition of that patient.

Public Folders

A folder in the Folder List that can be shared with multiple users. See 'Folder List' (see page 51).

Rack

See Exam Rack.

RCC

View position and breast examined: right cranial-caudal

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Recent Images

Clinical images from previous exams of a patient that can be relevant for diagnosing or rating the current medical condition of that patient. Recent images date back to a limited time in the past – typically, several weeks.

Relevant Prior

An exam with same body part or modality plus body part, that is considered to be relevant to the current exam.

Report

A written language representation or a voice recording of a diagnosis or a description of a procedure on paper, audiotape, and/or in electronic form.

RIS

Radiology Information System

RMLO

View position and breast examined: right medial-lateral oblique

ROI

Region of interest

Role

Defines the type of user; for instance, a radiologist, a radiographer, or a system administrator. A set of permissions and access to system functions are associated with a role.

Screening

Examination or testing of a group of individuals to separate those who are well from those who have an undiagnosed disease or defect or who are at high risk.

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Breast Screening: A federal program to gather information about breast cancer in a defined group of the population.

Sequence

Ordered list of hanging protocols

Series

Set of medical images that are acquired with one piece of equipment and are spatially related to each other (i.e., same frame of reference).

Series and Image Linking

The ability to combine two images to view, pan, or view slices simultaneously. See 'Linking Image Series' (see page 224).

Shelf

See Exam Rack.

Shortcut Bar

A customizable way to access your most frequently used folders, filters, and tools. See 'Shortcuts Bar' (see page 60).

Single Read

Workflow where a single reader (radiologist) evaluates and rates the clinical images.

Split Exam

The feature that allows you to split a series according to specific DICOM tags. See 'Splitting Exams' (see page 256).

Step Zoom

Zoom function that divides the image into rectangular areas of an equal size. Each area is displayed with the pixel-to-pixel zoom setting. All areas can be displayed sequentially, in a stepwise manner.

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Study

A set of images. In IntelliSpace PACS, a study is associated with a SUID (Study Unique Identifier).

System Administrator

Person with special permissions to define the users of the system and hospital-specific settings; for example, roles and worklists.

System Filter

A filter created by an IntelliSpace PACS user that can be shared with multiple users. See 'Filtering Worklists' (see page 149).

System Preferences

Various settings that control the behavior of IntelliSpace PACS that are system-wide. See 'Setting System Preferences' (see page 355).

Task

Used by System Administrators to assign organization-specific privileges to users.

Tele-Radiology

The feature that allows users to retrieve images that are lossy-compressed (non-diagnostic quality). See 'Teleradiology Mode' (see page 45).

True-Size Zoom

Zoom setting that approximately represents the actual size of the anatomical structures on the screen.

User Filter

A filter created by an IntelliSpace PACS user that is only available to that user. See 'Filtering Worklists' (see page 149).

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User Preferences

Various settings that control the behavior of IntelliSpace PACS for the user. See 'Setting User Preferences' (see page 337).

Window Width/Window Level

Window Width is the total range of pixel values displayed on the screen. Increasing the window width will decrease the contrast.

Window Level is the value of the pixels at the center of the range defined by window width. Increasing the window level will decrease the brightness.

Worklist

A list of cases to be worked on. The user may specify the contents of the worklist.

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23 Accessing PDF File of Online Help

To view this book in PDF format, go to: http://<server IP>/ PACSAdministration/Help/PrintableHelpManuals.aspx

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